MARCH 31, 1956
VOL. 150—NO. 13

Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY

SNOW SHOES AND ALL

Lineman of Michigan Bell Telephone Co., along line near Ironwood, keeps going despite heavy snows in Michigan's Upper Peninsula. Linemen often resort to snow shoes and toboggans to cope with severe winter weather.

Published every week on Saturday by TELEPHONY PUBLISHING CORP. 608 S. Dearborn St., Chicago 5, Ill. Subscription $3.50 per year. Entered as second class matter at the Post Office at Chicago, Ill., under the act of Mar. 3, 1879.

Guaranteed Circulation This Issue
10,914 of Which 10,373 is Paid

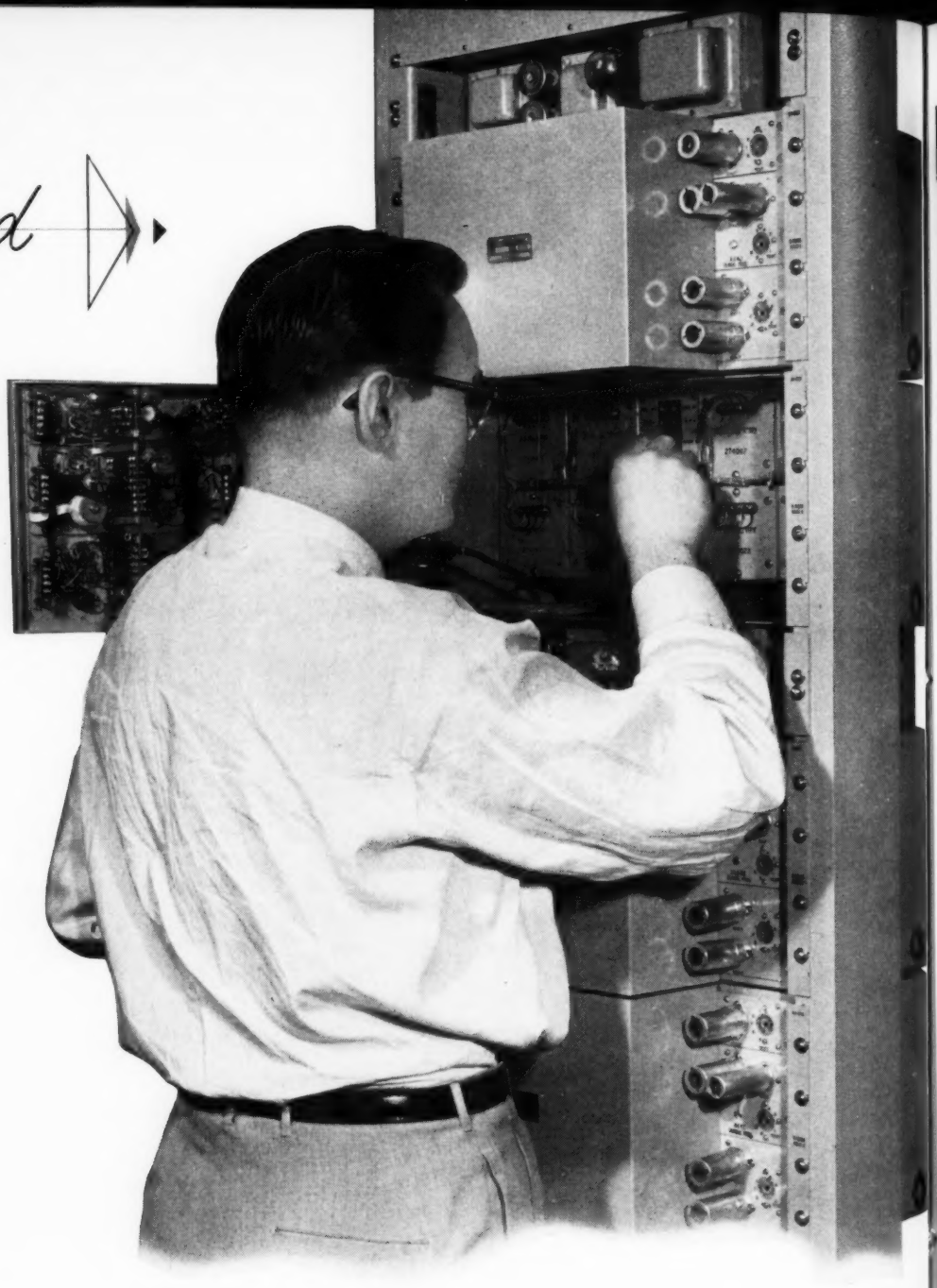
MANAGEMENT • PLANT • TRAFFIC • COMMERCIAL • LEGAL • ACCOUNTING

XUM

Stromberg-Carlson

Look ahead

Engineering



See how front-access design serves you best in carrier equipment

Ease of installation—economy of space—flexibility for expansion—serviceability over long years—aren't those your prime requirements in carrier? Here's a system engineered to provide them all.

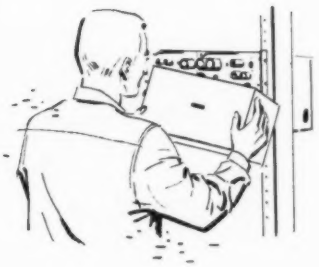
All aligning adjustments are completely accessible from the front. To place the equipment in service and maintain it, your man works by simply removing the cover which normally is closed to avoid tampering or damage.

No elaborate test equipment is required, since all equipment is accessible, front and rear, and tests are made with all components in place. You need only a few spare parts for that rare occasion when something "lets go."

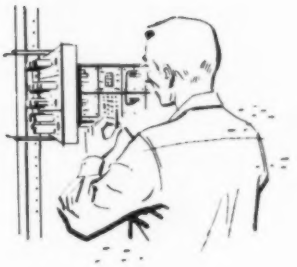
Thus Stromberg-Carlson enables you to expand traffic-handling capacity and to maintain it in a high level of service at lowest possible cost thanks to look-ahead carrier engineering.

Service ...it's easy as 1-2-3!

1. Your man has access to the vacuum tubes and associated test jacks instantly. He can pull a tube or make a test at seven points without taking any covers off—*all done from the front.*

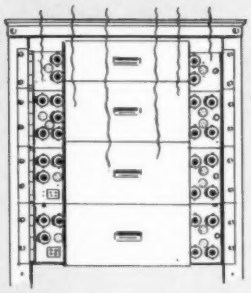


2. He can check relays by removing the metal dustproof slip-on covers. Other components requiring checking from the rear side are accessible by opening the hinged chassis—*all done from the front.*

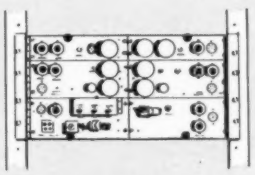


3. To reach all filters, the main terminal strip and test jacks, he swings open the hinged chassis. It's easy and fast—*all done from the front.*

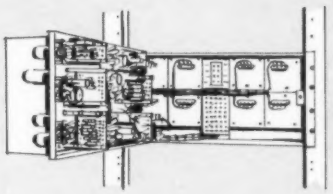
Stromberg-Carlson Look-Ahead Engineering Gives You All These Carrier Advantages



1. "Chimney" Heat Removal • Stromberg-Carlson design provides "chimneys" to let heat rise. Tubes stay cooler, last longer.

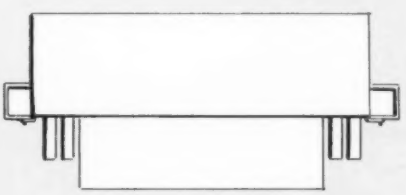


2. All-in-one Modular Units • Line Filter, Voice Unit and Signaling Unit are packaged in one sub-panel. Fewer parts to install, require less space.



3. Instant Dial Conversion • Change over from ring down signaling to dial with a simple strapping arrangement. No costly plug-in relays needed.

4. Life Preserver Diode Package • Modulation diodes are sealed in a *plug-in* container. No soldering required. Varistors are compensated for different life spans. Diodes last longer, are easy to replace.



5. Front Access • All service and inspection points are in the front. No "jungle gym" experts needed. Save time, space, and money.

STROMBERG-CARLSON COMPANY

A DIVISION OF GENERAL DYNAMICS CORPORATION

Rochester 3, New York

To Improve

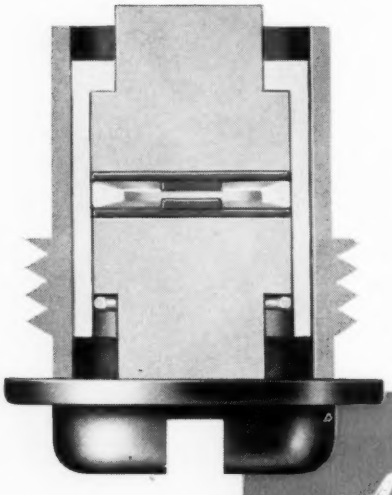
CABLE TERMINAL AND SUB-STATION PROTECTION

Mytigap

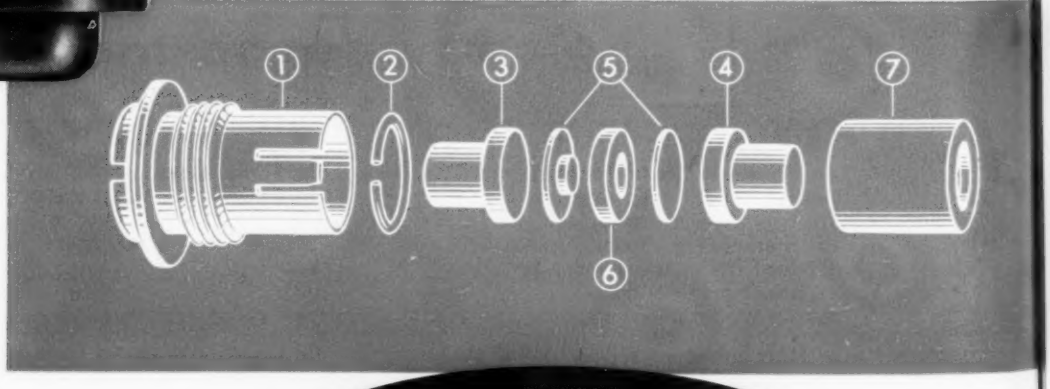
DESIGNED FOR INTER-CHANGEABILITY WITH OTHER MANUFACTURERS' TERMINALS.
PART No. 41-474

GIVES MAXIMUM PROTECTION AND LOW COST OPERATION

A lightning arrester, surge and power cross protector all in one with self restoring operation after functioning. The internal structure of the MYTIGAP is so arranged that an arc of moderate duration will cause the electrodes to warp together, thus providing a continuous metallic path to ground and eliminate the arc. These electrodes stay in contact as long as they are sufficiently hot, but when the disturbance ceases, they quickly return to their normal position leaving the telephone line in its normal state. The MYTIGAP is also arranged so that the interior parts are readily accessible, therefore, any parts that become melted by extreme disturbances can be readily replaced.



	Description	Part No.
1	SHELL	41-473
2	LOCK RING	41-472
3	BACKING BUTTON	41-471
4	BACKING BUTTON	41-471
5	CONTACT ASSEMBLY	41-470
6	INSULATING WASHER	41-469
7	INSULATING CUP	41-468



COOK ELECTRIC Company
Since 1897

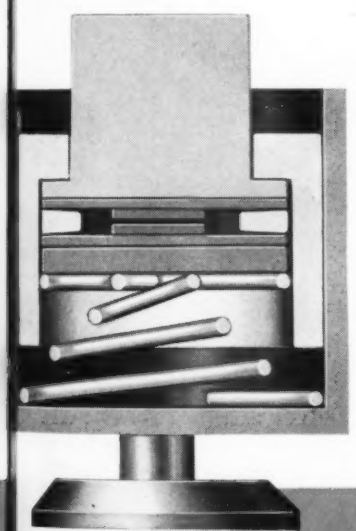
2700 SOUTHPORT AVENUE CHICAGO 14, ILLINOIS

To Improve
CABLE TERMINAL PROTECTION

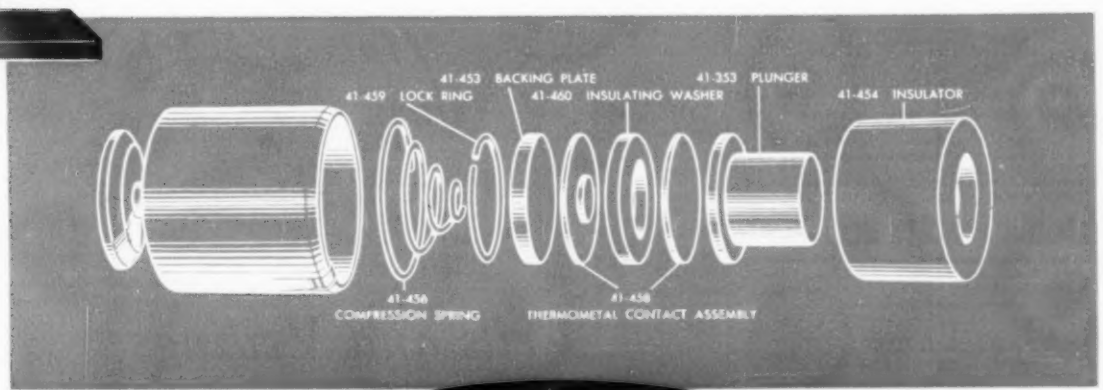
Mytigap

BUILT LIKE AN AUTOMOBILE SPARK PLUG

The new Cook MYTIGAP Arrester for protection of telephone circuits against lightning and power potentials employs no carbon or organic material in its construction. Its discharge electrodes are an alloy of nickle, manganese and RU78. This is the same material used for the electrodes in the spark plug of your automobile engine and, obviously, it withstands the destructive effects of arcing and oxidation better than any other known material.



The average service free life of a spark plug employed in an 8 cylinder engine is 10,000 miles, and is required to fire 13,527,000 times in an atmosphere of vaporized hydrocarbons at a temperature of some 1800°F. and a pressure of 150 pounds per square inch. Such rugged, dependable service is possible only by the use of effective material for the discharge electrodes. By using this material for the arcing points, the tendency to foul the gap (as often happens when carbon electrodes are used) is eliminated.



COOK ELECTRIC Company
Since 1897

2700 SOUTHPORT AVENUE CHICAGO 14, ILLINOIS

Kellogg Announces "Grabaphone and Talk Right"

Have you ever reached for your desk telephone, and on attempting to bring it to a convenient talking position, found the cord wound around the ink stand, under the letter basket or tied into knots until it is so short you can not get close enough to the transmitter? Disaster and destruction are the results. We know just how you would like to express your thoughts and how you wish some one had intelligence enough to invent something to get away from such trouble.

The Kellogg Switchboard & Supply Co., having for some time realized your need, has developed a practical and efficient Grabaphone which is going to change this and make it a pleasure for you to use the telephone. Kellogg Bakelite ear cap and mouthpiece help to make this set indestructible. Only one hand necessary to use the Kellogg Grabaphone, the transmitter is always just where it should be, insuring the greatest efficiency in transmission, and it makes no difference whether you are in a standing, sitting or reclining position. *

FREE DENTISTRY

SMALL CHARGES FOR MATERIAL.
GRADUATE DENTISTS ONLY.

Consult the Most Reliable Painless Extractor
IN THE WORLD.

WITHOUT PLATES.

Originator of ROOFLESS PLATES and REMOVABLE BRIDGEWORK.

Our Bridgework and Platework is unexcelled.
Our object is to give the Laboring People the Best Dentistry at the Smallest Expense to them.
Our examiner will give you the best advice in the world.
Call for FREE examination and consultation.
Note the following prices till April 9:

$2.00	FULL SET OF TEETH GUARANTEED	$2.00
$5.00	BEST SET OF TEETH	$5.00

22k Gold Crowns (cost material about), $1.50
Bridgework (cost material about), $1.00
Re-Enameling (cost material about), $1.50
Gold Fillings (cost material about), $ .50
Silver Fillings $ .25
Porcelain Crowns (cost material about), $1.50
ALL WORK GUARANTEED 10 YEARS.

Laboring People's Dental Co.,

Gas Lamp Supplies

Easter Hats

WE'VE unquestionably reached the highest point attainable in the Millinery art.

Veils and Veilings

NEW Mesh Veiling, including all the shades and combinarions which are now so much in demand. Old rose, green combinations, also wine, plum, gray and lavender, in the fine hair line meshes, at, yard, 50c to $2.

lly Veils in an endless variety. | Plain Hairline Mesh Veils, chenil
white and ited mull bor

* *This is taken from actual material which was used to advertise the old Kellogg "Grabaphone!"*

Ex Pa
Mr. an ored reside celebrated anniversary Duffy's Mal only tonic. weak and lag
The recent wedding anni G. Fider, Ill., in which years ago par grandchildren was a memoral
They were fifty years ag Island for ab terview Mr.
"For years Pure Malt W sturdy old age regular use. folks of our
Duff
$3.5

every pair why W. L. world, why longer, and $3.50 shoe
EQUAL TO HIG
"I have been Las $2.50 shoe years, and hav highly satisfac equal in style much higher
SHO
ESTABLISHED 1876
W. L. Dougl sells more shoesthanan ufacturer in
$10,000
$3.50 All

KELLOGG INGENUITY SERVES YOU TODAY AS IT DID 50 YEARS AGO

KELLOGG K500 TELEPHONE

The K500 telephone is the sleek and handsome descendant of the pioneer "Grabaphone." It brings you the outstanding quality and dependability that characterizes its unsurpassed performance. The simplicity of the K500 design provides a new service efficiency and quality which makes this instrument well worth your immediate attention. Write for complete details today.

1910

1920

1930

1940

1950

and more to come

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Vandyke 6759

Export Distributor:
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50 Church Street
New York 7, New York

XUM

FLASHES AND PLUGS

'SNO WONDER. Residents of the nation's biggest city were to a large extent homebound during the recent blizzard, but they certainly did a lot of talking.

New York Telephone Co. reported a new record for gabbing was established on the Monday of the storm. Usually about 17.6 million calls are made in the city each day, the company said; 35 million calls were made that Monday—15 million more than the last record on Nov. 27, 1950.

Although operators braved the elements to increase switchboard staffs by more than 25 per cent above normal, the heavy volume brought delays of minutes in making calls in residential areas, it was reported.

Calls for weather forecasts, normally, 89,000 queries daily, ran five times heavier for a period.

The greatest concentration of calls was in residential areas or between residential areas and business districts. Company spokesmen attributed the heavy telephone traffic to office workers notifying employers of delays in getting to work and date-making by teen-agers whose schools were closed.

Operators made their way to central telephone exchanges on foot through drifts, in police squad cars, milk trucks and snow plows. One hitched a ride on a garbage truck.

Night shift operators remained on duty until day shift relief arrived. Former operators, presently in clerical positions, were assigned to switchboards. Retired operators voluntarily reported back at their old posts.

One of them, who retired last fall after 50 years of service, walked a mile through the snow to one exchange.

•

SOMETHING IN COMMON. In Peoria, Ill., a recent issue of the *Journal Star* carried the following story on one of the newspaper's employes:

"Whenever our *Journal Star* telephone switchboard operators receive a long distance call they must find out whether it is prepaid or collect for their records. So they say, 'Are you paid?'

"Last week one of our operators was having a few slack moments and began reading the society section of our newspaper. A long distance call came in. 'Are you married?' our operator asked quite distinctly.

"There was a vague hesitation on the other end of the wire. 'Yes,' answered the obedient caller.

"With a ghastly chill, our operator realized what she had said. In her most friendly tone of voice she commented: 'That's nice. So am I.'"

•

DAFFYNITION. Chinese Telephone Directory: One containing thousands of Wong numbers.

CIRCULATION

Guaranteed circulation of this issue is 10,914 of which 10,373 is paid.

Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY
Since 1901

March 31, 1956

CONTENTS

IN THE NATION'S CAPITAL 17
By Francis X. Welch

TRANSISTORS IN TELEPHONE CIRCUITS—Part 1 20
By Harold B. McKay

THE PLANT MAN'S NOTEBOOK 23
By Ray Blain

PLANT MAN'S QUIZ 24
By Ray Blain

TODAY'S HIGHLIGHTS OF FINANCE—TAXES—BUSINESS TRENDS 25
By Willard B. Stanley

TROUBLE CLEARING—MORE ABOUT ANGLES AND ALTERNATING CURRENT—Part 48 28
By L. N. Martin

TELEPHONY'S PBX SERVICE ADVISER'S HANDBOOK 34
By Gilbert R. Brackett

COURTS AND COMMISSIONS 38

HELPFUL LITERATURE 48

TELEPHONE EQUIPMENT INDUSTRY ON TV 55

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Telephone WA bash 2-2435

Sound reasons

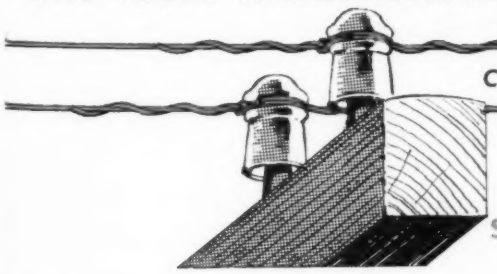
for stringing Copperweld TRADE MARK non-rusting Line Wire

- Copperweld* Line Wire "talks better" than any other high-strength conductor, due to its thick, molten-welded copper covering.
- Copperweld retains its high transmission efficiency permanently, because it can't rust.
- Copperweld is the only long-span conductor suitable for carrier. When you build with Copperweld, you can convert to carrier circuits, when required, without additional investment in overhead lines.
- It's sound reasoning to use Copperweld, the best engineered wire for voice, signal and carrier circuits.

*Trade Mark

COPPERWELD STEEL COMPANY
WIRE AND CABLE DIVISION *Glassport, Pa.*
For Export: COPPERWELD STEEL INTERNATIONAL COMPANY, New York

the ideal combination...



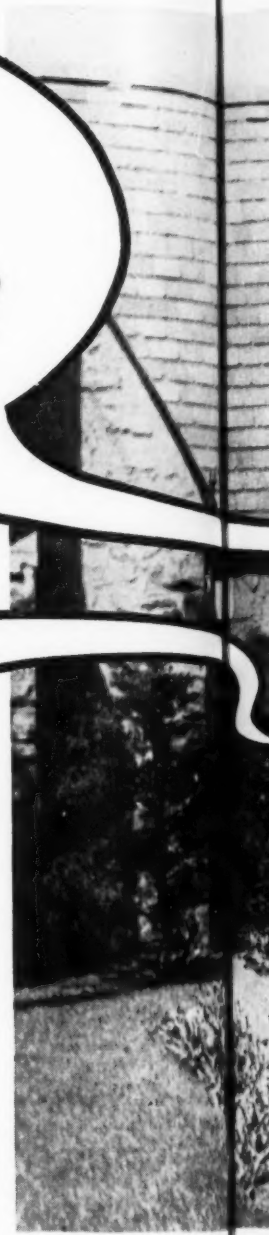
COPPERWELD LINE WIRE and GRIP-FLEX INSULATOR TIES

SOLD BY LEADING DISTRIBUTORS

XUM

Question:

Where did they put the LEICH DIAL SYSTEM?



Answer:

Under the tulips!

Moral:

Leich Dial Systems are operating dependably in every section of the country, under every variation of temperature and climate.

Leich Dial Systems are operating in quonset huts, private homes, attics, basements, etc.

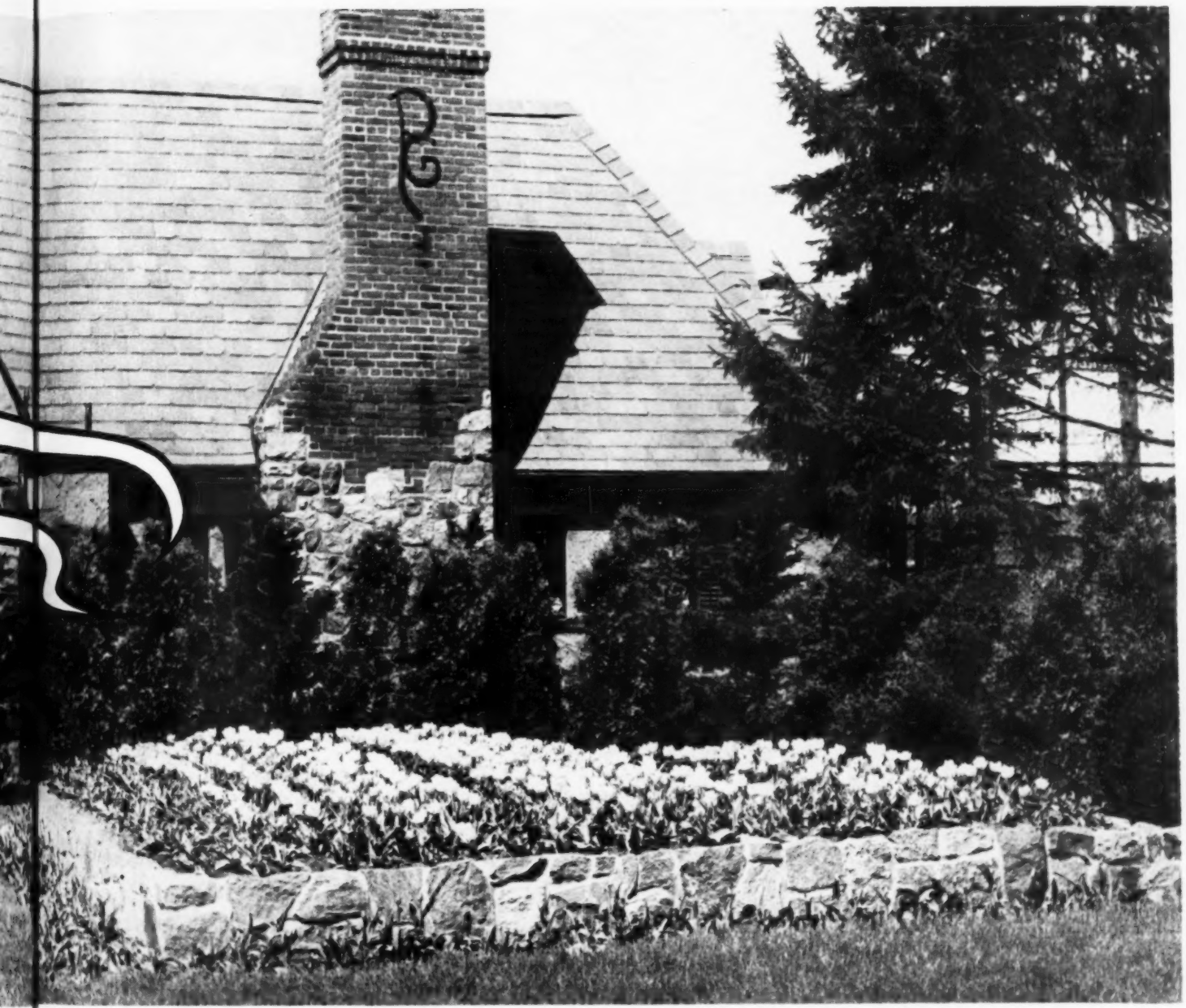
This one takes the prize for being the most unusual installation. For here, the Leich Dial System has been installed in an underground vault located beneath the bed of tulips in the above picture. Access to the vault is through a metal trap door behind the flower bed.

This installation is at the General Motors Proving Ground at Milford, Michigan. The 100-line Leich Dial System is used for PABX service, serves 163 telephones. It was installed in 1951.

After 3 years of faithful service, this board is being replaced by a 230 line board which will be housed in the new administration building.

Don't think however, that the old board is being retired to pasture. It will be added to another Leich Dial System PABX where 100 additional lines are needed.

LEICH



FOR DEPENDABLE SERVICE

Leich's all-relay Dial System has very little to get out of order. There is no movement of parts other than that of the dependable relay armatures. You'll find that out of the 600 Leich Dial installations many are performing faithfully under very unfavorable operating conditions.

There is no automatic dial switching equipment that doesn't need regular routine maintenance. But experience has shown that the Leich Dial System will operate dependably, year after year, with the very minimum of care.

FOR ECONOMICAL OPERATION

We really surprise customers when we explain all the economies of operation that are part of the Leich Dial System.

You need less space, it is faster and easier to install. With Leich's jack-in equipment you can add ten lines for $175.00 and a link to a 100-line, finder-connector switchboard for $323.00. What's more—these are total costs, for no factory installers are necessary.

Then too — you can shift whole 100-line bays or parts from one exchange or PABX to another as was done with the PABX in this story.

Write today for our catalog which tells you how you too can go dial . . . faster, better, and at less expense, with a Leich Dial System.

MANUFACTURERS OF TELEPHONES, SWITCHBOARDS AND RELATED APPARATUS SINCE 1907

LEICH SALES CORPORATION 427 W. RANDOLPH STREET CHICAGO 6, ILLINOIS

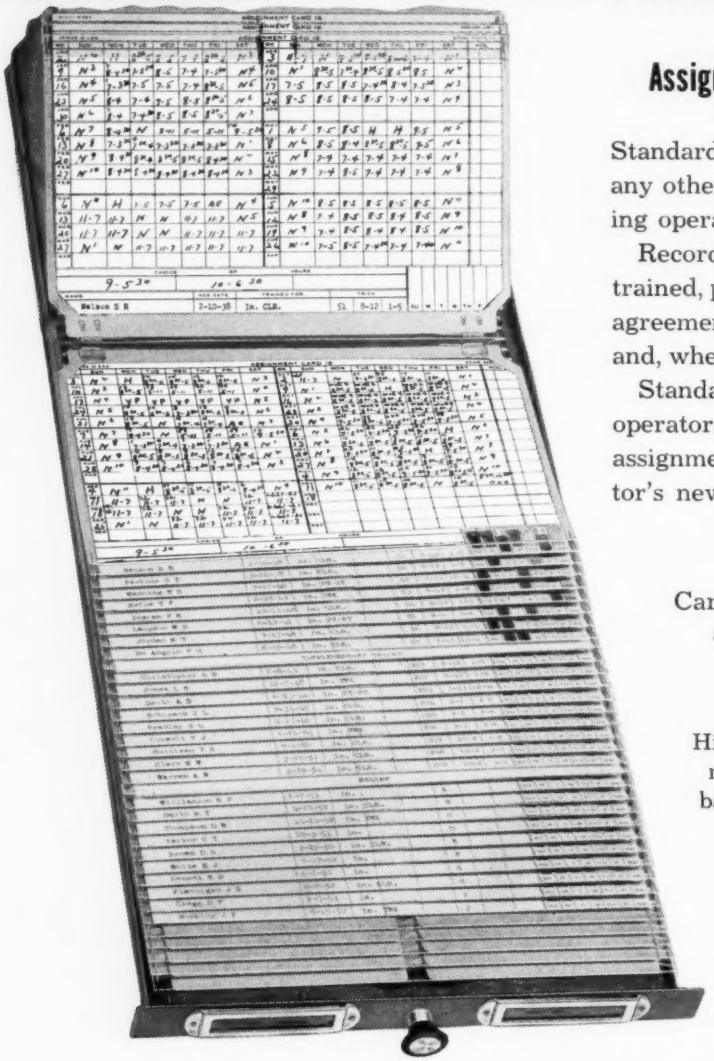
PACIFIC COAST: 11401 WEST PICO BLVD., WEST LOS ANGELES 64, CALIF. SOUTHWEST: 1227 SLOCUM ST., DALLAS 7, TEXAS

GENERAL SYSTEM INDEPENDENT

ACME VISIBLE

FORCE ADJUSTMENT RECORD

Visible Card Method for Assignment of Operators' Tours of Duty and Days Off



Standard for the telephone industry and used more than any other method or combination of methods for assigning operators' tours of duty and days off.

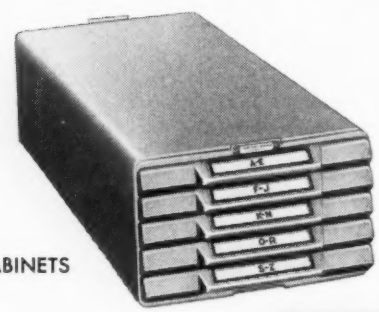
Record shows the assignments for which an operator is trained, personal preferences, seniority and local working agreements. Holiday and night tours are fairly assigned and, when possible, in accordance with individual wishes.

Standardization of the System facilitates transfer of operators from one district to another with up to date assignment history, fitting into the system of the operator's new district.

ACME VISIBLE

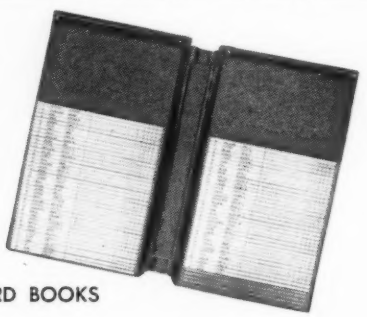
Card Books, Easel-Type Card Books, and Cabinets are standard for the record—selection depending upon size of force, office procedure, etc.

Available with standard Kraft Acme Permanently Hinged Vision Pocket (illustrated); the previous six months assignments of an operator are placed in the back of the pocket facing the current assignment card. Acme All Acetate Permanently Hinged Pockets also available; they offer the added feature of permitting a full year's weekly assignments to be placed on one card, the previous six month's history being visible through the acetate when the pocket is turned. Standard Force Adjustment forms and Acme Visible Lock-In Train Signals have been specifically developed for this system.



CABINETS

EASEL-TYPE CARD BOOKS



CARD BOOKS

ACME VISIBLE RECORDS, INC. CROZET, VIRGINIA

District Offices and Representatives in all principal cities

Here are two informative booklets, illustrating and describing various units, for telephone companies.

Send for your copies today.

ACME VISIBLE RECORDS, INC., Telephone System Division, Crozet, Virginia T3-31-56

Please send us illustrated booklet

☐ #994 on Acme Multi-Card Bulletin Holders ☐ #982 on Acme Flexoline for Telephone Companies

☐ Have representative call. Date..... Time.....

☐ We are interested in Acme Visible equipment for ..... records.
KIND OF RECORD

Company..... Attention.....

Address.....

City..... Zone..... State.....

PWC®
ELECTRICAL WIRES, CABLES & CORD SETS

Aerial and Duct

TELEPHONE CABLES

PWC EXCHANGE CABLES . . .
are taking a prominent place in the current telephone expansion programs. Whether for metropolitan, suburban or rural locations, PWC cables will furnish years of dependable, trouble-free service.

PWC TYPE 144 Cables have polyethylene insulated conductors. The cable assembly is shielded with aluminum tape and jacketed with a hard service, long-aging polyvinyl compound. REA listed.

PWC TYPE 150 Cables are premium construction offering individually color coded polyethylene insulated pairs. They are shielded with .002" copper tape and jacketed with hard service, long-aging polyvinyl compound.

PWC TYPE 190 Cables are constructed with polyethylene insulation, aluminum tape shield and a new hard service polyethylene jacket. This jacket has excellent resistance to sun and moisture.

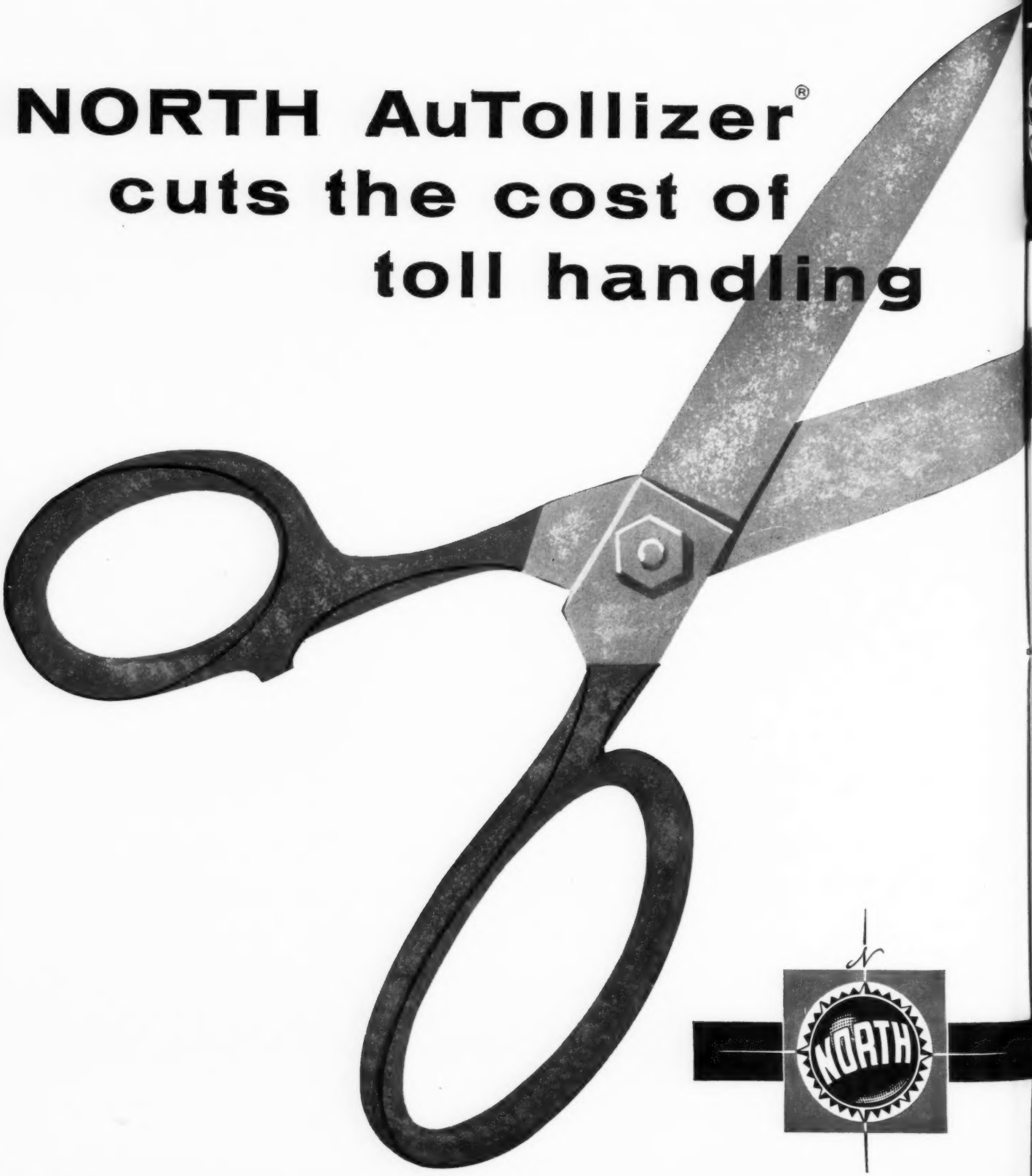
These are three of the eleven well known PWC telephone cable "Types" manufactured for the telephone industry today.

PLASTIC WIRE & CABLE CORPORATION

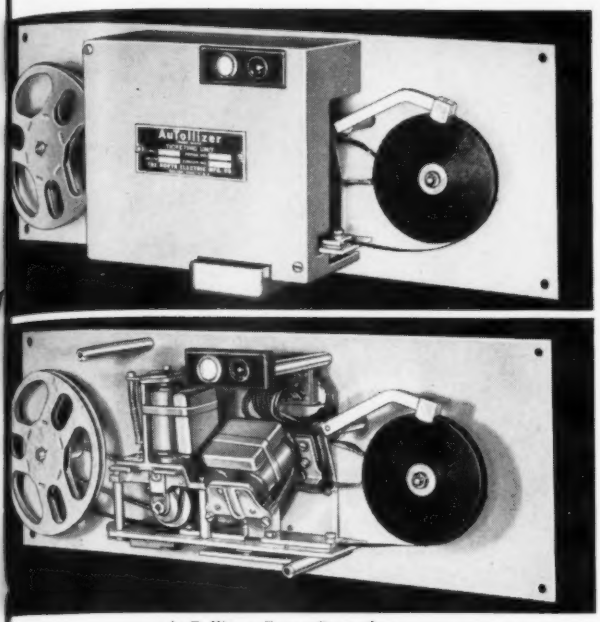
JEWETT CITY, CONN.

XUM

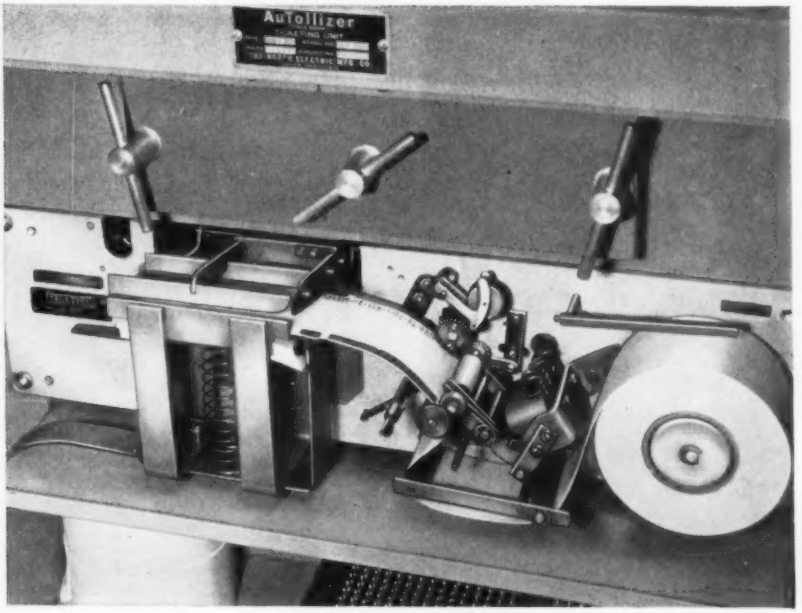
NORTH AuTollizer®
cuts the cost of toll handling



NORTH



AuTollizer Tape Recorder



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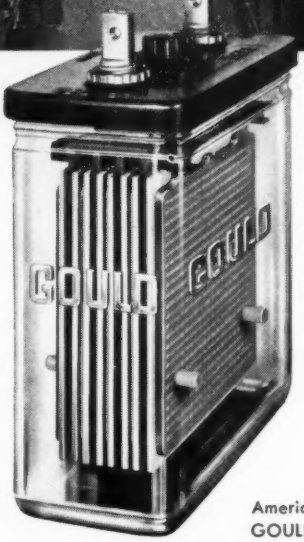

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IN THE NATION'S CAPITAL

BY FRANCIS X. WELCH, WASHINGTON EDITOR

Bill requiring setting of rate base on original cost or net investment fails to pass in New York Legislature. Highway bill to go to House floor. . . . Calls for payment for 50 per cent of relocation expenses. FCC fears radio-TV censorship.

TELEPHONE companies in New York were literally "saved by the bell" when the New York Legislature adjourned on Mar. 23 without final action on a bill to change the statute regarding telephone rate-making. The bill, which grew out of the recent New York court of appeals decision in the New York Telephone Co. case, would have required telephone rate-fixing to be based on original cost or net investment, the same as gas, electric, and other New York utilities.

The bill had powerful support from Democratic Governor Harriman, from the New York Public Service Commission, and from the leading Republican state official, Attorney General Javits. It had passed the assembly and there was reason to believe that if it had reached the senate floor it would have passed the senate as well. But that is academic now because the legislature adjourned before the committee could report the bill, thereby killing it for the session.

The reason why there was a reluctance on the part of the senate finance committee to report the bill out, despite a special message from Governor Harriman in the closing days of the session urging final action, doubtless can be traced to the persuasive testimony made before the committee by opponents of the bill.

This was another one of those "sorehead" bills often introduced in state legislatures by opponents of utility company rate increases whenever they lose out in the courts on the question of fair value *versus* original cost rate base. Such bills generally attempt to change the "ground rules" by changing the statute. But they have repeatedly failed in other state legislatures under similar conditions — Maine, Maryland, Pennsylvania, Illinois, and Ohio, being recent examples. Of course, the New York bill could come up again next year —probably will. But so far it's been blocked.

Among the witnesses appearing before the senate finance committee in opposition to the bill was Keith S. McHugh, president of the New York Telephone Co. (TELEPHONY, Mar. 24, p. 31). It was the original application of the company for a 68.5 million dollar rate increase, which resulted in the New York Court of Appeals decision in favor of a fair value rate base for New York telephone companies. And it was this decision that stirred up the agitation for the legislation.

What McHugh had to say on this bill, however, makes a lot of sense outside, as well as inside, New York State. His comments on the danger that inadequate or too long-delayed rate increases could result in deterioration of service standards are apt and timely almost everywhere in the United States today.

He told the senate committee that incalculable damage would be done to the quality and scope of telephone service in New York State in years to come if the state legislature passed the proposed bill to wipe out consideration of the value of telephone plant in establishing rates. He said the bill would work an injustice on more than 100,000 telephone employes and on the 270,000 Bell System shareowners in this state who have invested in the business. He said:

"The telephone business requires very large amounts of new capital to take care of growth and keep on giving good service. This year we expect to build 260 million dollars of new and improved plant.

Almost none of this new capital comes from retained earnings because there are little or no retained earnings. We must raise this money from investors but we cannot unless we are financially sound, because the corporate and government search for new capital is as highly competitive as the selling of goods and services.

"Our company, largest in the Bell System, has had the smallest increase in rates. Our average telephone rates are up only 17-2/3 per cent since before the war, the lowest in any state. In the same period the cost of living is up 92 per cent."

Since 1910 the New York law has required that the commission, in setting rates for telephone service, give due regard to a reasonable average return on the *value* of the company's property. The fact that the state commission has ignored this section of the law since 1944 is held largely responsible for the company's inadequate rates and unsatisfactory earnings, indicated the New York Telephone Co. president. In nine of the last 15 years the New York Telephone Co. has failed to earn enough to cover its regular dividend.

McHugh made a very interesting comparison between New York City's notoriously run-down subways (and the Long Island Railroad as well) and what would happen to the telephone service if its financial needs were similarly ignored. Passage of the public service commission bill would take a very long step toward adding telephone service to the "unhappy company" of the Long Island Railroad and the New York City subway system, he said.

In regard to these, he declared that he was "confident that a substantial part of the difficulties has resulted from rate consideration that was too little and too late—from their being denied fare increases when they most needed

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them and when they would have done the most good." He then went on to declare:

"Use of a value base has never meant run-away telephone rates. We have never sought and will not seek returns higher than those essential for financial safety.

"What we are contending for here is the fundamental right to do business on the same basis as all other business is done—the right to have the current worth of our large investment recognized.

"We have faced and met the same rounds of wage increases as other businesses, the same increases in material costs and in construction costs.

"Why then does anyone expect that the telephone company, faced with great growth and improvement problems requiring very large sums of new capital, can somehow manage without proper increases in the prices of its services?"

Sound financial health is required if the company is to finance successfully its big construction programs, McHugh said. "So long as the thoughtful telephone investor thinks his savings are safe, that he can get a fair return on his money and that the future of the business looks good he will not only leave his savings in the business but he may add more to it as it needs capital to expand. But you may be equally sure that the informed investor will do neither of these things if he becomes convinced that the future looks doubtful and risky," McHugh continued.

He reminded the members of the committee that "Our corporate credit is like your personal credit — you only have to have serious doubts raised about it to find that you no longer have it. It does little good to say that past security issues have been successful. The important question is about those to come. Should the tremendous flow of new money we need cease or be curtailed substantially, it would be a sad day for all telephone users."

Conscious of the fact that New York now has a dual rate-making setup (whereby telephone rates are fixed on one basis and other utilities on another), McHugh made an interesting distinction between the revenue needs of telephone companies as compared with the power companies. He pointed out:

"Telephone earnings are more vulnerable; the man who loses his job may discontinue his telephone service in the emergency, but rarely his electric power. The telephone company invests large amounts in the equipment on the customer's premises; but the customer provides his own electric appliances.

"Telephone company costs tend to increase, the more people it has to provide ways of interconnecting; power companies have no such problem of interconnecting customers.

Taxes Too High?

T. Coleman Andrews, until recently Commissioner of Internal Revenue, is certainly a top-flight authority on the income tax.

In a recent radio address he had this to say about it, among other things: "The rates have been made so high that they are now confiscatory. The minimum is 20 per cent, the maximum 91 per cent. I'd call that confiscation with a capital 'C,' and vengeance with a capital 'V.'"

"Furthermore, 41 cents of every revenue dollar goes to labor in the telephone company; only 19 cents in the average power company.

"Our great state has a long history of justice to all. Yet, today, our company is at the bottom of the list in rate of earnings because we have been granted the lowest increase in rates of any state.

"We can give the people of our state any kind of service they are willing to pay for, but we cannot give them the best service year in and year out unless they pay enough to make the best service possible.

"Unless we are permitted modestly better rates, unless our investors are given some protection against major and permanent changes in construction prices, it is only a question of time before there is bound to be deterioration in our ability to serve you."

Highway Bill Emerges

After considerable pulling and hauling in the House Public Roads Subcommittee, the controversial federal-aid highway construction bill is due to hit the deck for floor action in the lower chamber section around Apr. 1. It should pass the House—if it passes at all—before the end of that month.

As the bill cleared the sub-committee it contained an even broader provision for allowing compensation to public utilities for relocation expenses, than the bill originally introduced by Representative Fallon (D., Md.). In a last-minute decision, during the "marking up" of the bill, the sub-committee agreed to let the federal government pay public utilities for 50 per cent of relocation expenses instead of leaving to the states to decide whether the utilities should get any relocation expense at all.

So far, so good, and your correspondent sincerely hopes he will be proven wrong in his gloomy prediction at the beginning of the year that the "highway bloc" in Congress would mess the thing up this year just as they did last year. But there are still plenty of rocks and shoals ahead for President Eisenhower's 50 billion dollar program under which a 40,000-mile network could be completed by 1970.

Oddly enough it may turn out that the utility relocation expense provision will be attacked, not on its own merits (or demerits) but simply because of bad blood stirred up over the savage fighting which has been going on in the committee over *other* provisions of the bill.

For example, the sub-committee voted down a companion plan to have the federal government pay for the relocation of families whose homes are torn down to clear rights-of-way for the highway system. Rep. Charles A. Buckley (D., N. Y.), chairman of the full Public Works Committee, sharply criticized this decision. "We are willing to have the government pay to relocate utilities, but not people," he told his colleagues.

The group also approved an amendment offered by Rep. Frank E. Smith (D., Miss.) under which the federal government would guarantee bonds for some highways not included in the interstate system. Sub-committee members said this would insure financing for a new highway in Louisiana and Mississippi not covered in the federal program.

The sub-committee's final stamp of approval apparently was placed on these other controversial provisions of the highway bill: (1) The federal government will not pick up the tab for toll roads and freeways already built by the states even though they are incorporated in the interstate system. The bill provides for a study to determine whether this should be done late; (2) present state regulations limiting the size and weight of trucks will be frozen pending completion of another study to decide the most desirable limitations; (3) wage rates prevailing in each community will have to be paid to all labor employed in building the proposed highways.

FCC Fears Censorship

Will the time come when the Federal Communications Commission will be told by Congress to regulate radio and television programs? This, of course, means censorship, and censorship is an ugly word in the radio and television business. But according to a signed story in the New York *Herald Tribune*, FCC Chairman McConnaughey has expressed the fear that unless the radio and television industries police their programs better, there is a very definite possibility that Congress will amend the Federal Communications Act so as to correct abuses of "overcommerciali-

zation." The FCC chairman was quoted as follows:

"If the industry doesn't tighten up, police its own programs and clean its own linen, it's inevitable that Congress will establish programming regulations by amending the act. There has been considerable agitation on the Hill for some time to step into the picture.

"I've been questioned about the matter by senators who are incensed at back-to-back commercials and general overcommercialization."

He referred to situations where the former balance of entertainment programs being interrupted by commercial announcements, is rapidly reversing to the point where commercial programs are being interrupted by entertainment. Some radio station listeners get three minutes of entertainment to 12 minutes of commercials.

McConnaughey passed this warning along to the presidents of some 43 broadcasting associations, who attended a recent meeting in Washington. These broadcasters are very much concerned.

The odd thing about the problem is that the public is not doing very much complaining about it. But McConnaughey thinks that that might be the really dangerous aspect of the situation. When people just will not take the trouble to write criticism, when they are apathetic or resigned to abuses, it could mean that they consider the situation hopeless under the present set-up. And if the present set-up is supposed to be voluntary disciplining within the radio and broadcasting industry, a change of set-up would be the obvious alternative.

McConnaughey praised the National Association of Radio and TV Broadcasters for doing a good job in trying to carry out its code of good practice. But the code is entirely voluntary, depending upon the consent of members. And there are a good many broadcasters who do not even belong to the broadcasters' organization. In any event, the code is not enforceable on anybody who does not want to obey it.

McConnaughey is quoted as making this thoughtful suggestion about the value of state associations (still speaking of radio broadcasters) in policing difficulties of this sort:

"It is my belief that the state associations (of broadcasters) will have to augment and supplement provisions of the code by policing their own members.

"There's nothing so potent in holding a group in line as a state organization which can act at the local level. They should make their own people toe the line.

"There's no doubt that something has to be done to impress upon the radio-TV industry that they are guardians of a public trust. This guardianship is inherent in the granting of a broadcasting license.

It's all right to call this an open, free and competitive enterprise. But broadcasters owe more to the public than a man operating a gas station."

REA Makes Loans to Three Companies

Loans in REA's telephone program, for the current fiscal year, during the week of Mar. 12-16 reached $53,019,000, the U. S. Department of Agriculture announced. This exceeds the total amount of such loans made in all of the preceding fiscal year when they amounted to 52.7 million dollars.

During the period of Mar. 12-16 the REA made loans to three borrowers in North Dakota, Oklahoma and Oregon. They totaled $843,000. Details of the loans follow:

United Telephone Mutual Aid Corp., Langdon, N. D., on Mar. 12 was authorized to borrow $476,000, the company's second REA loan.

The cooperative plans to use these funds, together with the first loan of $411,000 made in October 1953, to provide a modern telephone system to serve 1,221 subscribers in Cavalier County. This includes 552 families and other residents now without telephones.

The United Telephone corporation has acquired the Langdon exchange from the North Dakota Telephone Co. and proposes to acquire the Wales Mutual Telephone Co. and two small farmer-owned local lines. These facilities, now providing common battery and magneto service to 669 subscribers over 168 miles of line, will serve as a nucleus for the extended service.

Present plans include new automatic central offices at Langdon and Wales, and 471 miles of new line. About 123 miles of existing line will be rebuilt and the remainder retired. The United cooperative will provide switcher service to 22 local families who own ther own lines.

Francis Kitsch is president and Frank Solberg is manager of the United Telephone Mutual Aid Corp.

*

Elmore City (Okla.) Telephone Co. on Mar. 14 was allocated a loan of $221,000, its first REA loan.

The new borrower is a commercial company. It now provides common battery and magneto service to 325 rural subscribers in Garvin County. It plans to use the REA loan funds to convert its existing system to automatic operation and add facilities to serve 188 additional rural subscribers in the area.

The company proposes to construct a new automatic central office at Elmore City and add 119 miles of new line. Of the existing line, 46 miles will be rebuilt, 22 retained in place and the remainder retired.

David P. Blaker is president and Frank W. Cagle is manager of the Elmore City company.

*

Also on Mar. 14, Fossil (Ore.) Telephone Exchange secured an allocation of $146,000, first loan, to improve and extend rural telephone service in Wheeler County.

The new borrower is a commercial corporation which now provides magneto service to 341 rural subscribers over 14 miles of line in and around Fossil and Kinzua. This includes 32 rural families who own their own lines.

The company plans to use the loan funds to construct new automatic central offices at Fossil and Kinzua, and 63 miles of new line. All of the existing line will be retired. With these changes, the present subscribers will receive improved service, and 78 rural families in the area will receive service for the first time. The 32 families receiving switching service plan to abandon their lines and become regular subscribers of the expanded system.

Clarence Asher is president and manager of the Fossil Telephone Exchange.

XUM

TRANSISTORS

in Telephone Circuits

By HAROLD B. McKAY

PART 1

"There is no life, truth, intelligence, nor substance in matter."—Mary Baker Eddy.

AS MAN GROPES further into his material universe, it becomes increasingly difficult for him to describe the things that he thinks he sees. Some of his discoveries cannot be described for what they are, so attempts have been made to describe them for what they are not.

The other day the physicists came up with an "anti-proton" which is apparently the opposite of matter. Sort of a negative form of matter as it were. Telephone companies already are using repeaters which have "negative resistance" which is resistance which isn't.

While the book, "Power of Positive Thinking," continues as a best seller, man's scientific outlook bears further to the negative. Now we are confronted by materials which conduct electricity not by electrons, but rather by electrons that are not there. This is called the "hole" theory of conduction.

Early in this century when the crystal detector was used in radio, it was discovered that such a crystal could also be used to produce oscillations. It was also foreseen by early experimenters that amplification would be possible some day.

In 1924, an arrangement called the crystodyne was made public which allegedly produced oscillations and amplification from a two-contact crystal detector. It remained for the Bell Telephone Laboratories, in recent times, to really work on the problem and the transistor is the result.

A practical transistor of the point contact type consists of a small crystal of germanium, which has two pointed wires or "cat-whiskers" touching it. One is called the emitter, and the other is called the collector. Another type of transistor, of later development, is the "junction" type which consists of a sandwich of three layers of germanium, two of which contain an additional element of one type and the other contains an element of another type.

The names which have been assigned to the different things connected with transistors probably cause a certain amount of confusion. The added elements, for instance, are called impurities, probably because the germanium is first made very pure and then the other element is added. However, it is added purposely and probably is not really an impurity any more than the salt added to your food is an impurity.

First of a Series

At the 1955 USITA convention there were shown the first models of telephone apparatus equipped with transistors instead of vacuum tubes. This apparatus included telephones for the hard-of-hearing, repeaters, and carriers. This equipment is now being used in the Independent telephone field.

This article is the first of a series of three articles which will describe the use of the transistor in telephone circuitry. A simplified explanation of the theory of transistors will be given first, followed by description of the apparatus which uses them.

Emitter

The wire which brings the signal into a transistor is called the "emitter"; that which takes it out is called the "collector." Yet, under some conditions, the emitter does not emit anything except "holes" like a gun shooting blanks. In some cases the collector does not really collect anything either. This situation probably resulted from an imperfect understanding of the crystal's amplifying action.

As more has been learned about the action of electricity in semi-conductor materials, better explanations of this action have been developed. Among these explanations is the "hole" theory of conduction. This theory holds that when an electron moves away from an atom, it leaves a vacancy or "hole" behind it.

Because the atom was originally balanced with equal positive and negative charges, the departure of a negative electron leaves the atom unbalanced with a positive charge predominating. That is, the "hole" or vacancy left behind is equivalent to a positive charge. This actually seems to be borne out in practice. The displaced negative electrons can be made to travel to a positive pole somewhere else, and the positive holes can be attracted to a negative point.

Thus, the negative electrons move in one direction and the positive holes in the other direction. This at least seems to reconcile one difficulty in tracing a circuit.

Once upon a time all circuits were

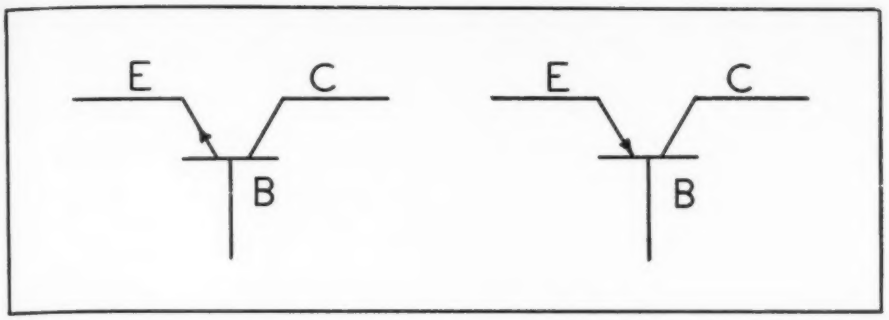

Fig. 1.1. These are the symbols used on drawing to represent transistors. E stands for emitter, C for collector and B for base. When the arrow on the emitter points towards the base it means a p-n-p transistor. That is the emitter and collector are made of positive material and the base of negative. When the arrow points upward an n-p-n transistor is represented, wherein the emitter and collector are made of negative material and the base of positive. (All drawings in this series are by Victor Willard.)

traced from positive to negative. When the vacuum tube became understood, we were taught that electron flow, and therefore electricity, in general, went from negative to positive. Half the people in the electrical business favored one route, half favored the other.

Now, it seems that both are right—something, either electrons or holes, is traveling in each direction.

In order to create this condition in materials like germanium or silicon, the element must first be prepared in a very high state of purity. A small trace of another element (such as boron) is then added to the pure germanium. The trace element which is added is chosen so as to have either a smaller number of electrons than the silicon or germanium or a greater number of electrons.

If the trace material has a fewer number of electrons, the mixture is unbalanced in a manner which provides holes or vacancies in the atomic structure. Because the trace element is a negative electron short, it results in the mixture becoming positive in nature.

If the added trace element has more electrons than the germanium or silicon, it results in a surplus of electrons in the mixture. In this case the material has a negative characteristic. The negative kind of material is simply designated "n" and the positive is called "p." A junction transistor, which is made of a piece of negative material sandwiched in between two layers of positive, is called a "p-n-p" junction.

Musical Chairs

The concept of free electrons that conduct electricity has long been used in explaining how current flows along a wire. However, the idea of "holes" that can conduct in the opposite direction has proved baffling to some.

At the risk of over-simplifying, the positive and negative conditions might be compared to a game of musical chairs—with variations. In the old game, a number of people would try to sit down only to discover there were not enough chairs to go around. Let's say that 10 people try to sit in nine chairs. The result is one man is left over; he can roam around the room; but he cannot sit down anywhere because all the chairs are occupied.

This man is like a free electron in a conductor. In the game, the people can all get up, dance around and sit down again; but one will always be left without a place to light; so it is with a semi-conductor. The extra man or electron floating around would give the group the character of a negative material.

Now suppose there is another game going on in the next room, only in this case there is one more chair than there are people. With 10 chairs and nine people, there will be a vacant chair. This vacancy is like the "hole" in a semi-conductor. It is not really a hole; it is just the vacant space left behind by something that has left.

If these people try to fill this vacant chair by each person moving to the left by one seat, the result will be that the vacancy travels to the right. That is, if the left hand chair was vacant first, and the No. 2 person moved into it, chair 2 would then be vacant. If No. 3 person moved into the vacancy at No. 2, the vacancy would then be chair No. 3. In this manner the vacancy or "hole" would move to the right.

If the extra man in the first game ran down the hall to the other room to sit in the vacant chair, this would be the same as current flowing from negative to positive. If he got to the chair, all would be equalized; and the current (and the game) would stop.

However, if some outside agency kept taking the vacant chair out the back door and sneaking it into the other room, the poor guy would never find a seat; and he would keep chasing the vacant chair around. The vacant chair, or hole, would always be going in the opposite direction as Mr. Electron.

In a transistor, the germanium in its pure state is of high resistance. You might even regard it as an insulator. When the emitter wire which touches the surface of the germanium is made positive by a battery, it attracts away some of the electrons, leaving vacancies or holes in the germanium. Remember that these holes, having had the negative charge removed are now the same as positive charges (or like vacant chairs).

The collector wire, which also touches the germanium is connected to the negative pole of a battery. The negative electrons, like the man looking for a seat, pour into the germanium to fill up the holes. If the emitter voltage were removed, the electrons from the collector would fill up the holes, and the current flow would stop.

However, as long as the emitter is positive, it, in effect, steals away the electrons in the germanium; and the electrons from the collector continually run in to fill the vacancies being left.

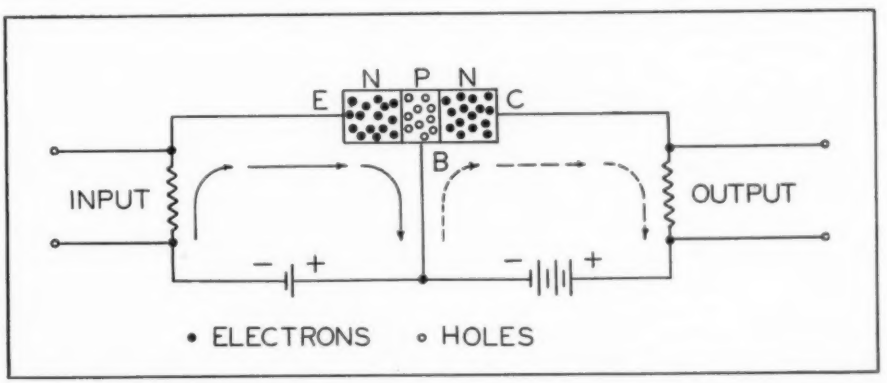

Fig. 1.2. When current from the small battery plus the input current enters the transistor at the emitter (E), it causes electrons from the left hand N material to move into the holes in the P material. The path of this current is shown by solid arrows. When the P material conducts, it permits current from the larger battery to flow through the base (B), to the right-hand N material, to the collector C, and thence to the output, as shown by the dotted arrows.

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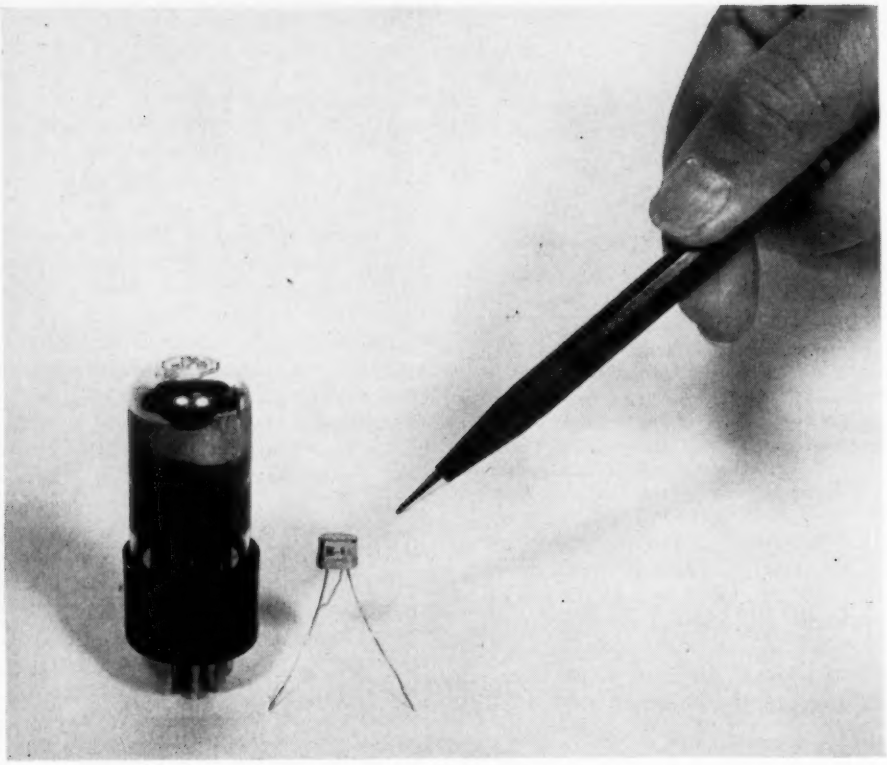


The pencil points to a transistor which is standing up on its wire connecting leads. For comparison, a regular radio receiving type vacuum tube is shown along side of it—Photo, Courtesy of Lenkurt Electric Co.

Thus, the emitter current controls the amount of collector current. The input resistance at the emitter is comparatively low, while the output resistance at the collector is high. A small item, therefore, controls a large item, which is the principle of amplification.

The reason for the difference in resistance on the emitter and the collector may be analyzed as follows:

The transistor actually consists of a "base" as well as the emitter and collector wires. The more recent junction type of transistor uses a sandwich of germanium. The center piece or base may be positive material, that is, it is shy a few electrons, and has a surplus of vacancies or holes. The outside layers are then negative in nature and have a surplus of electrons. This is called an n-p-n junction transistor.

The order of this may be reversed and the sandwich made up of a negative center enclosed in two positive layers. This would be called p-n-p. The action in either case is similar, but polarity of the batteries used must be reversed if a circuit is changed from n-p-n to p-n-p.

The point contact or cat-whisker type of transistor works the same way. The speck of germanium under each wire is either of the positive or negative variety.

In the hookup shown in Fig. 1.2, it can be said that two circuits actually exist—the input, through the emitter, and the output through the collector. Each of these circuits has its own separate battery.

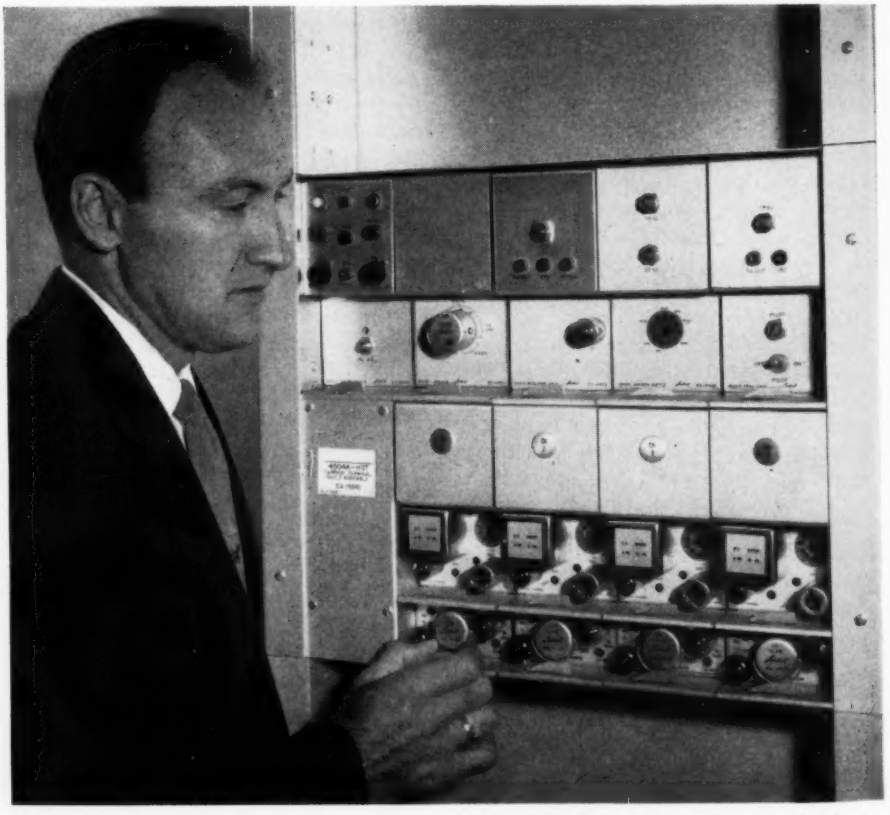
Now, aside from its amplifying effect, a piece of germanium in a circuit like this is also a rectifier. That is, it would change ac to dc. The reason this happens in rectifiers is that the "forward" resistance is low. By forward is meant the resistance when the battery is poled correctly for electricity to flow.

The backward resistance is the resistance of the same material when the battery is poled in a manner which is opposite to the way the current can flow. A perfect rectifier would have an infinitely high backward resistance; that is, it would be "open" to any current that tried to go through it backwards.

Actually, the germanium is not a perfect rectifier; but it does have a very high resistance to any reverse current. In the hookup in Fig. 1.2, the battery hooked to the emitter is in the proper direction; therefore, the resistance is low. Relatively heavy current, therefore, flows. This is why the transistor is a *current*-operated device and has a low input resistance. (The vacuum tube input is a grid which is "open," hence of very high resistance, and draws no current. The tube, therefore, operates on a basis of the *voltage* applied to the input.)

The output battery to the collector

(Please turn to page 54)



This four-channel carrier system is one of the new pieces of equipment which use transistors instead of vacuum tubes in some parts of the circuits. The few remaining vacuum tubes can be seen on the lower units—Photo, courtesy of Lenkurt Electric Co.

THE Plant Man's Notebook

BY RAY BLAIN, TECHNICAL EDITOR

"KING MORSE is Dead!" is the title of an article by Arthur Mefford, published in the February 1956 issue of *American Mercury*. This article states in part as follows:

"Jim Hill, the 'Empire Builder,' head of the Great Northern Railroad, was a bitter foe of organized labor. He experimented with the telephone and shortly substituted it for the telegraph on GN's train-order wires from St. Paul to Billings. Other roads, inspired by GN's switch, also tried out the new telephonic system.

"The telegraphers and their union fought tooth and nail, but by the end of 1916 their profession was doomed.

"Gradually, too, the commercial operators began to suffer. Their ranks were cut by the automatic Barclay, and then the vastly-improved Morkum. The Western Union and the Postal hired thousands of high-school girls and taught them to operate the machines in a few days. They soon replaced the Morse men on the heavy trunk lines—at half the pay.

"The actual swan song of the old-time Morse man was dotted-and-dashed soon after the close of World War I.

"We all knew it. No longer were we the 'indispensables.' The handwriting on the wall was plain. And one by one we turned to other fields of endeavor.

"But at heart, I am—and always shall be—a boomer operator. Tragic thought, never again shall I be lulled to sleep by the magic, plaintive, humming music of the Singing Wires.

"King Morse is dead! Long live the Telegraph!"

Apropos of the above, we noticed an item in *Wire and Radio Communication*, formerly *Telegraph and Telephone Age*, under Morse Telegraph Club Notes that chapters are urged to start planning now for the Morse birthday dinners on Apr. 28. The Grand Chapter will plan for a coast-to-coast Morse circuit to all chapters if arrangements are made in advance.

And so it would seem that King Morse is not dead at all and will never die as long as even one old brass-pounder is numbered among the living.

Not many years ago, the writer mentioned the fact that the telephone was rapidly replacing the telegraph for train dispatching and received a number of letters from readers berating us for even suggesting that voice would ever replace the click of the key.

There is at least one consoling fact though which we must never forget. More men are employed in communications at the present time—and at better wages—than was ever considered possible back in the days when King Morse was in power.

•

A recently developed plastic conduit should prove ideal for use on power panels, relay racks and other communication equipment. The sides of this conduit consists of a series of slots to provide entrance for the wiring. Wiring can be brought out of this conduit at any point desired and the lacing of cables will not be necessary. This conduit may be attached to any surface by the use of a special fastener that holds both it and cover in place. It is furnished in sizes from 1″ to 3″ square.

•

It is interesting to note that Michigan Bell Telephone Co. is experimenting with a mobile automatic telephone exchange. This exchange is actually a "central office on wheels" and is moved easily from one location to another whenever required. Equipment designed to serve 400 two-party subscribers is housed in a 40-foot box trailer.

This mobile CDO could be used to provide temporary telephone service to subscribers living in rapidly expanding communities who would ordinarily be required to wait three months or more while permanent facilities were being constructed.

This versatile trailer exchange carries auxiliary parts that may be required to handle most types of interoffice trunking. Approximately 380 Garden City, Mich., residents have been served since Dec. 18, 1955, by this mobile CDO while additional facilities are being provided in the regular exchange.

Another important value of this trailer exchange is its use in emergency situations — in dealing quickly with whatever type of disaster might strike any dial central office.

•

The use of buried cable on rural lines is on the increase in many parts of the country. In some cases, the drop from the main cable into the residence is also buried. It has in the past been common practice to loop the main cable up out of the ground and connect the lateral cable on a pedestal.

If development work now under way proves successful—and there is every indication that it will—a splicing chamber will soon be available which will make it possible to bury this splice underground and eliminate the necessity of the splicing pedestal.

•

Employes of the New Jersey Bell Telephone Co. experienced their safest year on-the-job in 1955. The number of lost-time accidents—ones in which the employe could not report for work due to an injury on the job—dipped sharply from 60 in 1954 to only 17 in 1955.

This remarkable safety record is attributed to a general recognition of safe practices by employes, stimulated by the work of the safety committees in all departments and at various levels.

•

If our home had been equipped with some kind of an alarm, when the window was broken and opened, the nearby police would have been warned, with the probable result that our losses would have been prevented and the burglar captured.

In order to provide this protection, it is necessary at the present time to lease a circuit from the home to the police station. The American District

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Telegraph Co. provides this type of service for many business concerns and it proves most efficient. They prevent robberies and apprehend burglars frequently. In most cases, however, the use of this type of service for the protection of the average home is considered far too expensive.

In this connection, we note with considerable interest that a firm in New York City has recently petitioned the Federal Communications Commission for authority to use experimental radio and conduct tests with a view to the development of radio alarm devices for emergency burglar protection.

This company claims advantages of radio operation over wire systems as economy in manufacture and installation, greater flexibility, ease of concealment, resistance to tampering and protection against false alarms.

This may all prove true, but, in our opinion, someone will some day devise an arrangement whereby this alarm feature may be added to the available local telephone circuit. When this is made possible, the cost should be materially reduced over the rental of a special circuit and reliable alarm service protection should be possible at a cost well within the means of the average family.

•

We note that several operating companies are considering adopting the practice of the Lincoln (Neb.) Telephone & Telegraph Co. of establishing an annual testing procedure of all central office and outside plant protective grounds.

We understand that these tests have been highly successful and permit remedial action of high resistance grounds before they can cause trouble.

•

Government offices in Washington, D. C., where wire tapping is a constant threat to security, remind employes constantly that they must refrain from discussing classified information over the telephone. Stickers on the telephones and even paper napkins in the cafeterias often carry this warning.

Some of the classified agencies are even considering the use of a "beep" signal on all conversations as a constant warning that classified information should not be discussed.

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It has been said that there is a line on the ocean where by crossing you can lose a day. There is a line on highways where you can lose even more.

Plant Man's QUIZ

BY RAY BLAIN, TECHNICAL EDITOR

Q. When is the chemical treatment of soil surrounding a ground rod considered desirable? What chemicals can be used for this treatment?

A. Chemical treatment of soil to reduce the resistance of a ground may prove desirable when the deep grounding method cannot be used due to a layer of underground rock. This treatment may also prove beneficial in reducing the variations in ground connections in areas subjected to extremely dry and then wet periods.

Magnesium sulphate, copper sulphate, and rock salt are all considered satisfactory for ground treatment. Because of its non-corrosive qualities, magnesium sulphate is frequently used. However, ordinary rock salt is more economical and if used in the trench method is usually considered satisfactory.

•

Q. When rural distribution wire is installed on jointly used poles, we are wondering what protection will be required for the telephone circuits?

A. The REA specifications on this type of wire have this to say on the subject:

"When the distribution wire is placed on jointly used poles with 7.2 kv to ground, single phase, multi-grounded neutral power systems will not require drainage protection for exposure less than 7 miles in length. For longer exposures or for higher voltages, drainage may be required. Drainage units may be installed for these conditions after their need has been determined.

"At both ends of each jointly used section, all pairs of the multi-pair distribution wire should be protected by means of regulation-type protected terminals."

•

Q. What type of safety device may be used to prevent men who must work on microwave towers from falling?

A. A recently developed life line arrangement should prove highly desirable for the use of all men who must work in high places. The workman wears a light belt that is attached to a safety grab device by a short length of light nylon rope. The safety grab device is then attached to a vertical ¾-inch manila rope that hangs through the working area. The safety rope grab device can be easily secured, can be moved up or down, and cannot be accidentally knocked off the rope. This device absorbs the shock of a fall, is light and convenient to use and will last indefinitely.

•

Q. We understand that cross-arms can be obtained with holes drilled in them for various pin spacings. Is this type of cross-arm considered economical for use on a line that may at a later date be converted to carrier operation?

A. A cross-arm of this type was developed and used rather extensively by the military during the war. This was a standard cross-arm drilled from 16 1¼-inch pin locations. The pins could then be shifted to support four pairs of wires spaced for carrier transmission or five pairs of wires spaced for voice frequency circuits.

These cross-arms proved satisfactory except in heavy sleet loading areas where they broke at the vacant pin holes.

We would not ordinarily recommend this cross-arm for general commercial use. It would appear to be a better plan to make use of the proper spacing on the original line construction to meet your contemplated future carrier requirements.

•

Q. Will it be satisfactory to splice aluminum conductors in cable by the same method as is normally used in the splicing of copper conductors?

A. The connection made by twisting the aluminum conductors together, as is the common practice with copper, will not prove adequate for aluminum. The oxide coating on aluminum wires results in a highly resistant connection.

In order to prevent this and to provide an adequate electrical connection in the conductors, a metal sleeve must be compressed over the twisted splice.

today's Highlights

of finance-taxes-business trends

by Willard F. Stanley

THE GOOSE HANGS HIGH—IN THE MARKET: As expected, President Eisenhower's decision to run touched off a rally in the stock market. Aptly enough, this announcement was made on Leap Year Day, Feb. 29—the importance of the decision keeping pace with the rarity of the day.

It's hard to find a sour note in the business symphony. U. S. Commerce Department survey indicates 34 billion dollars of 1956 spending for construction, an increase of something like 10 per cent over 1955. Reserve Bank's questionnaire to 2,800 families indicates the greatest measure of optimism at any time since this procedure was initiated in 1949. Practically all stock averages have passed well above their all-time peaks and—like Alexander the Great—now pine for new worlds to conquer. But, from our remote boyhood there remains in mind a quatrain which began "It may be so, but we don't know," etc., which summarizes our present outlook. In the face of all indices and statistics to the contrary notwithstanding, can the upward business spiral be prolonged indefinitely—unless accompanied by price inflation or some other attendant evil?

True, corporate earnings for 1955 continue to please, in almost all cases, and more significant, the latest quarterly earnings show a large majority of substantial increases, indicating the upward movement in business had not bogged down by January. Also, more current statistics—such as weekly retail store sales—point the same way.

No stock market break is predicted, beyond some technical correction of the recent gains, but we are wondering "how high is up" and whether we may not be scratching the ceiling. As of Mar. 10, the 50-stock New York Times average indicated a 23 per cent climb over Dec. 31, 1954. We computed an unweighted average of the first 50 listed common stocks occurring alphabetically under the letter "A," and found that the comparable increase was only 11½ per cent, about half as much as the "blue chips" in the Times average. This confirms what we've long believed, i.e., that the general run of listed stocks have not reflected anything like the percentage increase experienced by the selected group of "blue chips"—favorites of trusts and pension funds. This seems to prove the listed market, as a whole, is probably nowhere near as high in relation to past levels as the conventional "averages" indicate.

To conclude the subject of the stock market; our customary Times stock average had risen to 3 per cent above the last year-end when this was written (Mar. 23), compared to 4 per cent below that level at our last writing (Feb. 17)—a combined change of 7 per cent for the better. So the March movement—since the President's decision—has cancelled the previous dip in the current year and moved into new high ground.

Mr. Stanley, formerly financial vice president of Southwestern Public Service Co., an electric utility with over 160 million dollars in assets, is president of Corporate Services, Inc. of New York City. He is a member of Controllers Institute of America and New York Society of Security Analysts. He serves on three committees of the Controllers Institute having to do with federal taxation, social security and finance management. His articles are appearing once a month in TELEPHONY.

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MORE ABOUT BUSINESS TRENDS: We mentioned before the fine statistics coming through from all sides. The general public still continues to spend liberally—and to borrow a good part of the spending. Some economists view this with complacency. Laying no claim to authority as an economist (an honor to which we do not even aspire), it seems logical that at some point consumers' ability and willingness to mortgage their future income will give out—that after buying some useful gadget on installments, that type of buying will come to a temporary full stop. So the industries which may be first affected—assuming this theory is correct—would be those making household appliances in the least saturated (less necessary) fields.

Tendencies to weakness in these lines might be watched as possibly touching off the slideback in business so long predicted, but which is still conspicuous by its absence. Perhaps people who went through "1929" are prone to expect the present "boomlet" is bound to "burst," while younger folk, who missed the depression, are still feeling merry and bright. To end this subject on a lighter variation of the young vs old theme, a teen-age son said to his father, "Dad, did you hear 'The Missing Link and His Five What-Is-Its' last night on TV? That music really 'sent' me." "Yes," replied the father, "I heard it. The music sent me too—right out of the room."

* * * *

CAPITAL COSTS: Eleven new utility bond issues listed in Wall St. Journal's tabulation showed a decrease in yield of .03 per cent per annum (three decimals, in underwriting parlance) on the basis of their average bids at Mar. 14, versus their average original offering prices. This reflects bettering of levels in long-term debt predicted to occur following the close of the Ford financing. But the improvement has not been as marked as we had expected and quite recently a slideback in prices has been indicated and some recent issues haven't been moving even at the higher yields. In a week's time, Mar. 14 to Mar. 21, the average bids for the above 11 utility bonds have slid to indicate a yield basis something like 2½ decimals above average original offering prices—a net change of about 5½ decimals in just a week. It's generally taken that recent indications of Federal Reserve Bank credit policy are favorable to lower interest rates. But with business booming along, it's hard to imagine the need for loosening the credit strings. Treasury bill rates back and fill without significant change, but the most recent offering was at somewhat higher interest.

There still seems no reason to defer long-term financing with bonds or preferred stocks, if the money is needed now or soon. This view carries the approval of a leading public utility underwriting firm.

* * * *

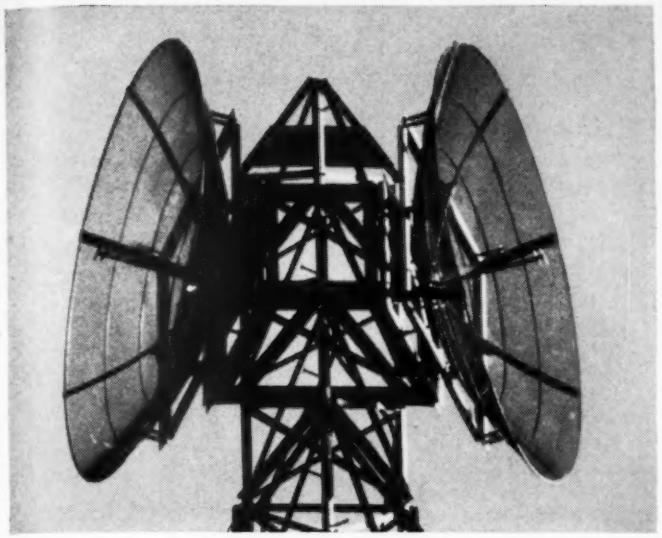
EQUITY FINANCING: If you figure your company will need common stock money within a year or even more, the attractive market in utility equities, from the standpoint of the issuing company, still points decisively, in our opinion, to doing such financing as soon as you can—with one qualification, as follows: Before proceeding with equity financing plans, you had better read the article referred to in the following paragraph. If you should adopt the new plan described in that article it might make your equity financing unnecessary.

* * * *

THE NEW TWO CLASS COMMON STOCK PLAN: This was briefly described in last month's column. An article by the writer, on this subject, appeared in the Mar. 17 issue of this magazine, so rather than discuss the plan further here, we'll avoid repetition by referring you to that article.

* * * *

FEDERAL INCOME TAXES: 1955 appears to have borne a bumper crop of court decisions on federal income taxes—affecting both individuals and corporations. Most of the latter do not seem to apply to telephone companies, but we've singled out, and report briefly below, two of these items, namely: (a) A decision holding if a company buys real estate for a business purpose and is then unable to use it for that purpose and sells it at a loss, such loss is not a capital loss, but deductible from ordinary income; (b) a decision holding that loss on sale of a "company car" is deductible from ordinary income if the car is used in company business. It has been generally established that losses on sales of any depreciable property used in a company's business are deductible from its business income. But motor cars, because of their relatively short write-off period, have sometimes been treated as orphans—outside this general principle.



BLAW-KNOX MICROWAVE PACKAGE

brings better telephone service to 100 communities

Three Blaw-Knox Microwave Transmission Towers are an important part of a recently completed three city–two state microwave-telephone toll system which was engineered, furnished and installed by Lenkurt Electric Company and Automatic Electric Sales Corporation.

This modern system links the Home Telephone and Telegraph Company of Indiana with General Telephone Company of Ohio. Originating at the 200′ Blaw-Knox self-supporting tower in downtown Fort Wayne, Indiana, signals are beamed to a 170′ Blaw-Knox guyed tower on the outskirts of Antwerp, Ohio. From this mid-point, messages terminate at the 150′ Blaw-Knox self-supporting tower in Bryan, Ohio.

Excellent toll service is now provided subscribers in more than 100 Ohio and Indiana communities . . . yet the cost of this efficient microwave-telephone link was less than a normal cable hook-up.

We'd like to help you plan better service for *your* customers. Write today for Booklet 2516, which illustrates Blaw-Knox Microwave Towers and describes Blaw-Knox tower engineering, design, fabrication and erection services.

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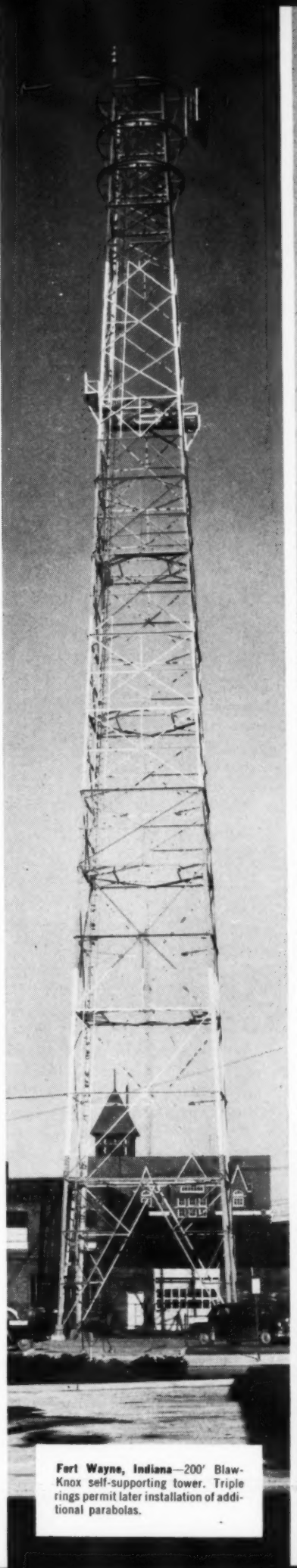
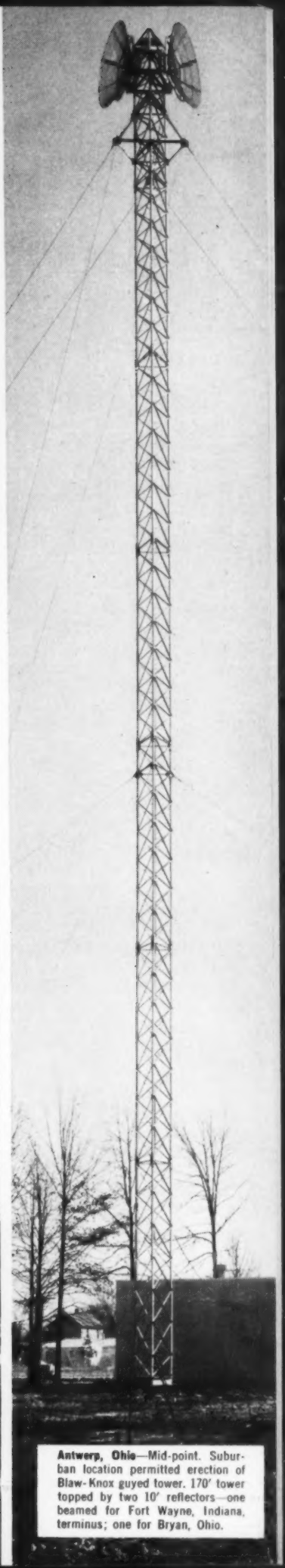


Fort Wayne, Indiana—200′ Blaw-Knox self-supporting tower. Triple rings permit later installation of additional parabolas.



Antwerp, Ohio—Mid-point. Suburban location permitted erection of Blaw-Knox guyed tower. 170′ tower topped by two 10′ reflectors—one beamed for Fort Wayne, Indiana, terminus; one for Bryan, Ohio.

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TROUBLE CLEARING

More About Angles and Alternating Current

BY L. N. MARTIN

IN OUR PRECEDING article we discussed angular measurement as a means of locating any point in a cycle of alternating current or alternating voltage, and we showed that when so used it is actually a measurement of *time*. Our purpose was to clear up some confusion which may exist in the minds of some ambitious telephone men who are trying to educate themselves in the technical part of telephone work, but who are having difficulty associating angles with their conception of electricity.

In this article we will discuss another use of angles in alternating current study. In this case the angle does not measure time but is a mental aid to certain mathematical calculations. There is no actual angle in the current. In other words: "The current does not turn a corner."

Resistance is the only thing that opposes the flow of direct current. It does this by introducing what might be called electrical friction or a braking action. It always causes a loss of power. Ohm's law states for a given electromotive force (E), the current (I) will be in inverse ratio to the resistance (R). This is expressed by the well known formula: $E/R=I$.

Alternating current is also affected by resistance and, in addition, it is opposed by two other things—inductance and capacitance. Inductance and capacitance oppose the current flow in quite a different way than does resistance. They generate a counter EMF which pushes against the original EMF and neutralizes part of it. This causes less current to flow. However, no power is lost.

Our present purpose is not to teach a complete course in the mathematics and principles of alternating current, but to clear up the reason that it involves the use of angles. Nevertheless, we will start at the beginning and cover all the principles involved, but in a condensed form.

Inductance is produced by a coil of wire wound on an iron core. A relay winding, a telephone ringer, and a telephone receiver are good examples of inductance or inductive windings. A winding without a core also has inductance but much less than the same coil with a core. There is even some inductance in a straight wire. The unit of inductance is the henry.

PART 48. The preceding article in this series appeared in the February 25 issue, page 24.

While a given coil has a constant number of henrys, the *effect* of these henrys is not a constant but varies with the frequency of the current. The higher the frequency the greater the effect of the inductance and, hence, the smaller the current flow. Therefore, we need a unit to measure the *effect* of an inductance, and it would be very convenient if we could use the ohm so that an ohm due to inductance would have the same effect on the current as an ohm of resistance. And that is just what we do.

The formula is: $X_L=2\pi fL$, where X_L is the effect of the inductance in ohms, $2\pi=6.28$ (approximately), f is the frequency in cycles per second, and L is the inductance in henrys. We call the inductance that has been converted to ohms, "Positive Reactance."

The value of any reactance depends on the frequency; therefore, the frequency must always be stated. We may say: "A Positive Reactance of 1,000 ohms at 20 cycles." If the same circuit were measured at 60 cycles it would have a much higher reactance.

A reactance also has another effect on the current. It causes a phase shift. A positive reactance causes the current to *lag* the voltage. This does not mean any change in the strength of the current, but any point in a cycle of the current occurs later than the same point in a cycle of the voltage. An inductive winding also has resistance but this is a separate component and is combined with any other resistance in the circuit.

Capacitance is produced by a capacitor (formerly called a condenser). A capacitor is an open circuit to dc, but seemingly allows ac to pass through it. The unit is the farad but as this is a very large unit, the microfarad is more commonly used.

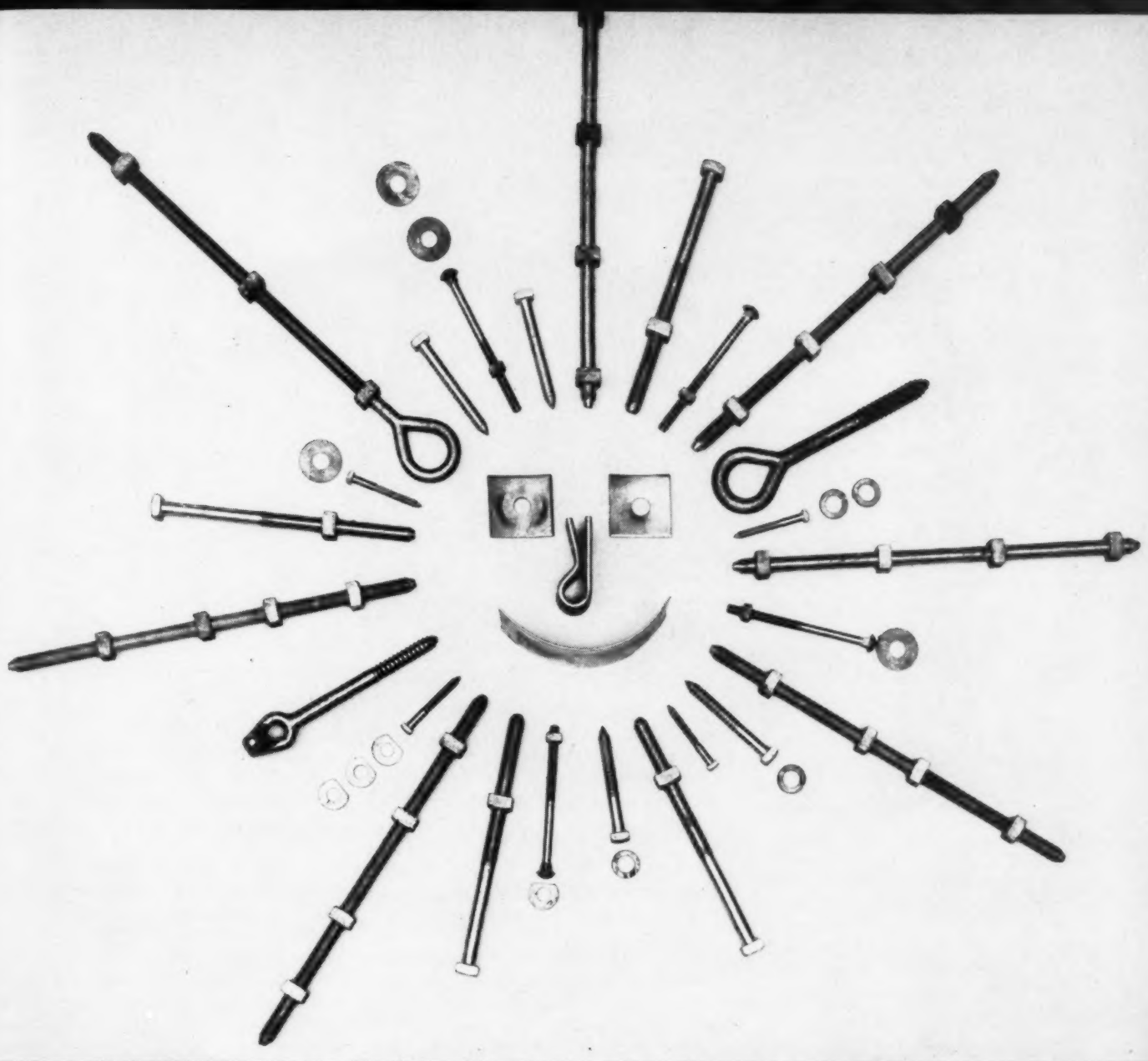
This quantity can also be reduced to ohms and when so expressed it is called "Negative Reactance." The value of negative reactance in ohms varies with the frequency of the current. *The higher the frequency, the less the effect of the negative reactance in reducing the current.*

Therefore, the formula which follows is in the form of a reciprocal: $X_c=\frac{1}{2\pi fC}$, where X_c is the negative reactance in ohms, and C is the inductance in farads. We more often use the formula: $X_c=10^6/2\pi fC$, where $10^6=1{,}000{,}000$ and C is the capacitance in microfarads (mf). A negative reactance causes the current to *lead* the voltage in phase.

The frequency at which a reactance is measured or computed must always be stated. Thus, we may say: "A negative reactance of 40 ohms at 1000 cycles." If this same capacitance were measured at 60 cycles it would have a much higher reactance.

We now have two quantities: Positive Reactance and Negative Reactance. If both are in series in the same circuit, they neutralize or cancel each other, either partially or completely. If both have the same numerical value, they cancel each other completely and have no effect on the circuit. If they are not of the same numerical value they are added algebraically. Thus, the sum of 10 ohms positive reactance and 10 ohms negative reactance is zero. The sum of +10 ohms and —5 ohms is +5 ohms, and the sum of —10 ohms and +5 ohms is —5 ohms. The formula is $X_L - X_c = X$.

We now come to the final step—combining resistance and reactance to form impedance. The word "impedance" means the combined effect of all the resistance, capacitance, and inductance in the circuit and it is measured in



Mainstay

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ohms. It is in this step that the angle is introduced.

Let us now consider a problem: A certain circuit has a resistance (R) of 4 ohms and a positive reactance (X) of 3 ohms at 1,000 cycles. What is its impedance at 1,000 cycles, and what is the angle of the impedance?

The impedance is *not* 7 ohms. Resistance and reactance must be added by a process called geometric addition or vectorial addition. This can be best explained by the diagram in *Fig. 1*. It should be understood, however, that such problems are never solved by drawing a diagram and measuring the lines of the diagram. The drawing is just a means of demonstrating the principle involved.

In *Fig. 1*, the horizontal line AB represents the resistance and the vertical line AC represents the positive reactance. (If the reactance were negative, the line AC would extend downward from A.) We then draw line CD equal to and parallel to AB, and line BD equal to and parallel to AC, forming a rectangle. We next draw the diagonal AD forming the right angle triangle ABD whose sides are AB (or R) and BD (which is equal to X), and whose hypotenuse is AD (or Z). The angle DAB or O is also important.

The object is to find the length of the line Z, which is the impedance, and also to find the angle O. Any one having an elementary knowledge of trigonometry and a table of the functions, or a slide rule, at hand would solve this by trigonometry as follows: tan O = X/R = ¾ = .75, and from the table we find that O = 36° 52′.

We then use the formula: sin 36° 52′ = X/Z and the table shows us that Z = 5. This is written Z = 5 ohms $\angle$36° 52′ which means that the impedance is 5 ohms at a positive angle of 36° 52′ and that the current will *lag* the voltage by 36° 52′. If X were negative then the angle would be negative and would be written: Z = 5 ohms $\angle$−36° 52′ which means that the impedance is 5 ohms at a negative angle of 36° 52′ and would cause the current to *lead* the voltage 36° 52′.

Those who have not studied trigonometry may find Z (but not the angle) by arithmetic, using the famous law of Pythagoras which states that in a right angle triangle the square of the hypotenuse is equal to the sum of the squares of the two sides or: $a^2 + b^2 = c^2$ where a is the altitude, b is the base and c is the hypotenuse of a right triangle. In our problems we have: $4^2 = 16$; $3^2 = 9$, 16 + 9 = 25, and the square root of 25 is 5.

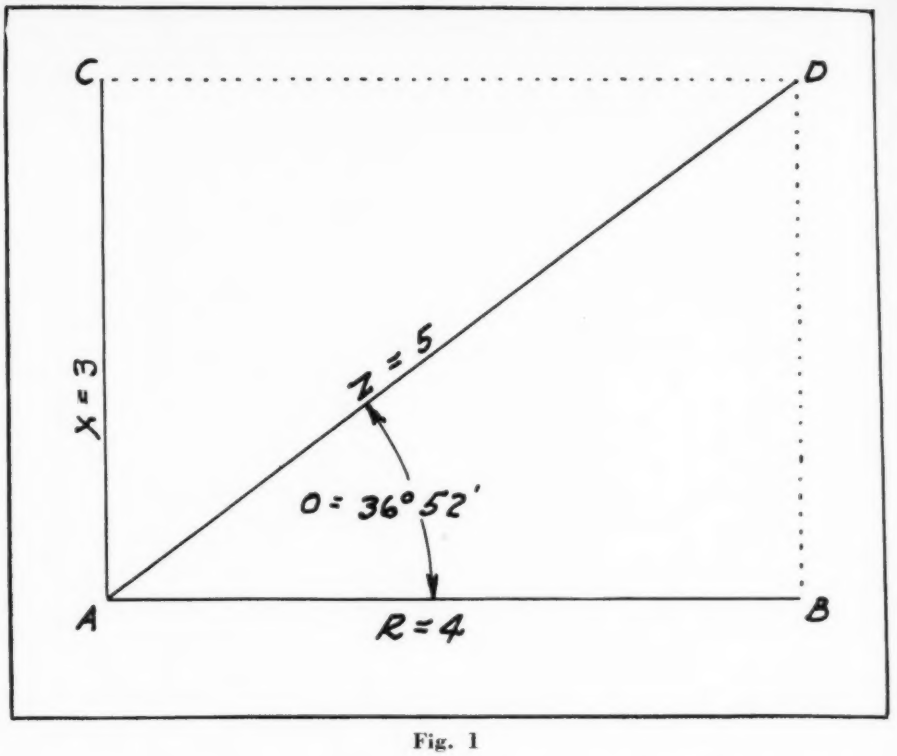

Fig. 1

Of course, all problems are not as easy as this one as they may involve finding the square root of much larger numbers. Probably all of our readers learned to solve square root in grade school and at that time found it no more difficult than long division. It is just as probable that most of our readers have now forgotten the method. Well, it is easier to learn the second time. Just consult any school arithmetic text book. Tables are also available which give the square root of all numbers from 1 to 1000.

It may not be necessary to find the angle but when it is necessary we know of no better way than trigonometry or the slide rule. However, we have seen a very ingenious chart with which anyone without trigonometry can solve a right triangle.

The impedance which we have found may be one of several arranged in any combination of series and parallel elements. To solve such a network it is absolutely necessary that the angle of each impedance be considered.

Problems such as we have just discussed are often stated: R + jX = $\underline{Z/O}$. The j before the X indicates that $\underline{X}$ is a vector and must be added at right angles to R. Often, we are given this problem in reverse, i. e., given an impedance and its angle, to find the resistance and reactance components. This requires trigonometry or possibly the chart which we mentioned.

It is necessary to add three notes in order to make some of our statements in the foregoing more exact.

Note 1. Inductance has no effect on dc so long as it continues to flow at a uniform rate. It does have a momentary effect at the instant the circuit is opened or closed or if the current is varied.

Note 2. When a dc voltage is connected to a capacitor there is a momentary flow of current to charge the capacitor, then the flow ceases.

Note 3. The ac resistance of an inductive winding is usually somewhat higher than its dc resistance due to core losses. This increase is still part of the resistance component. It should not be confused with the inductance.

We hope that this article will be helpful to those who are striving by home study to master this subject.

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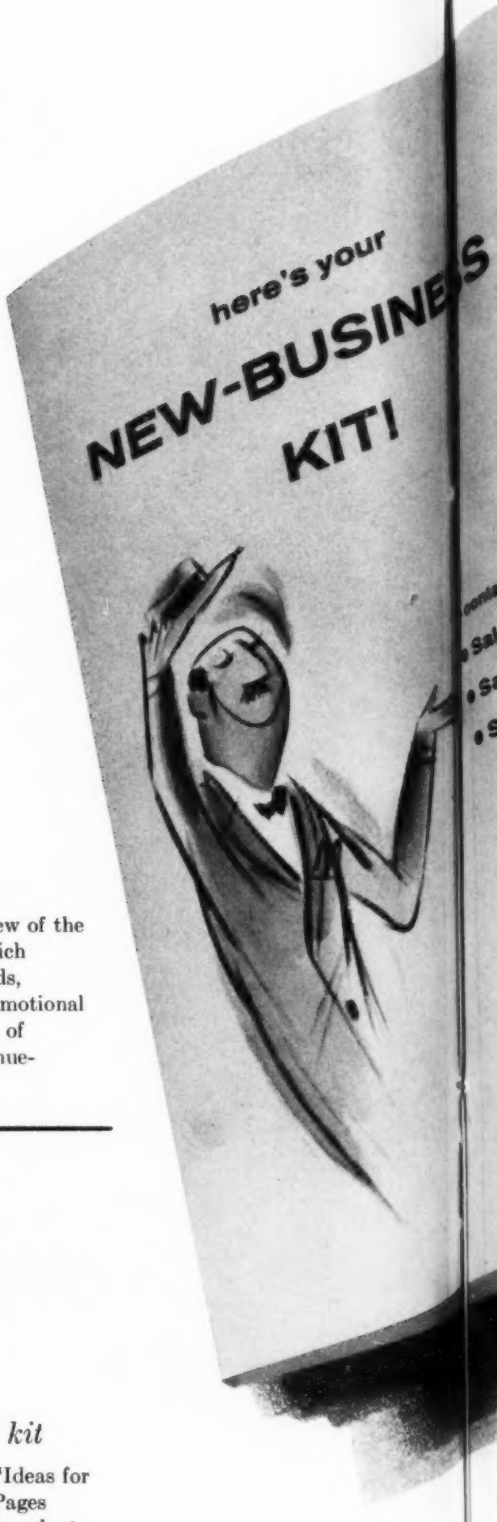

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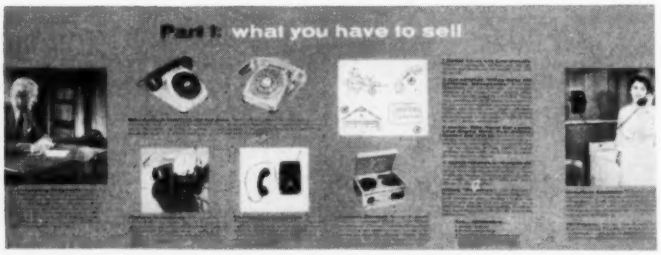
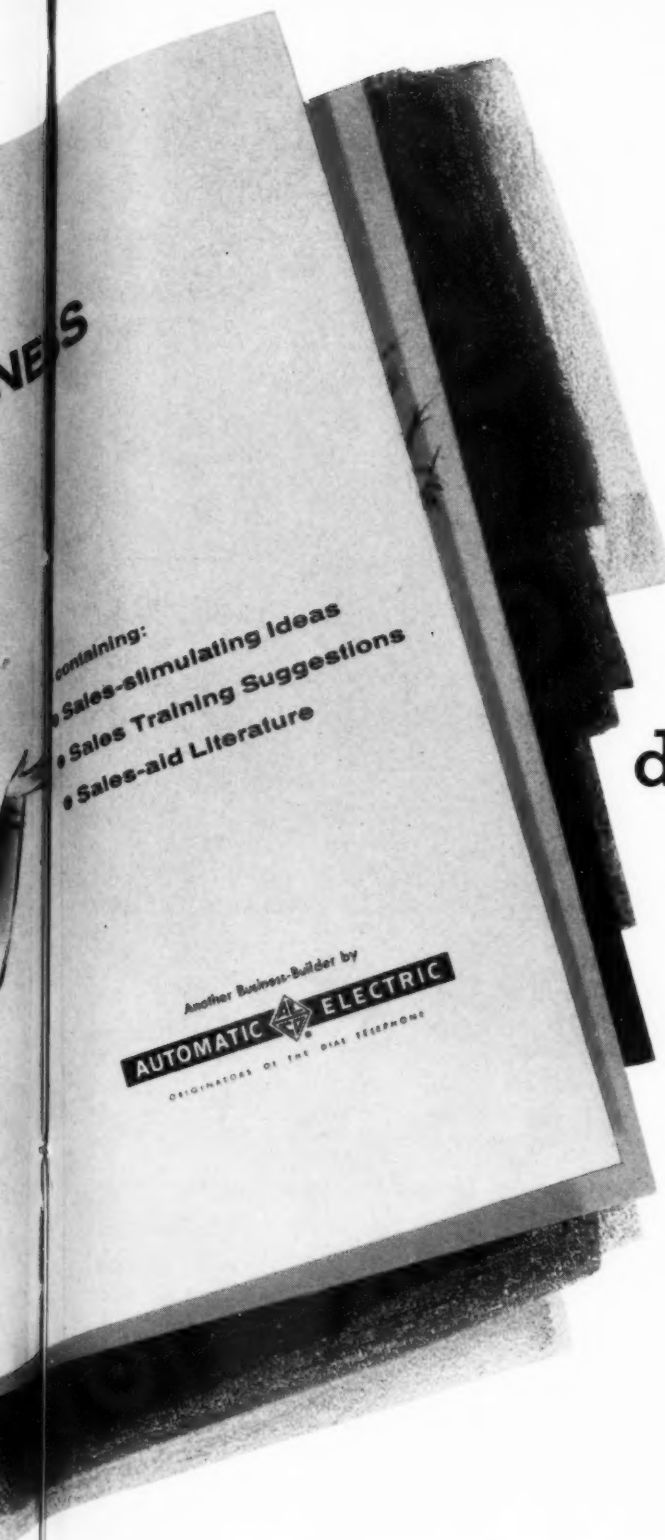


(a)

(b)

King-pin of the kit

is this helpful guide "Ideas for Building Business." Pages shown *at left* are: (a) products being promoted successfully today, and (b) a complete plan for promoting them.



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Section 4 (continued)

What then can the Service Adviser do? As a service supervisor, she must recognize that a person is entitled to know what he gets in return for the money he spends for goods or services. Common sense tells her that the quality of a product depends, to a great measure, upon the skill of the individual who makes it. And, while there are difference of opinion as to the fairness of methods by which information relating to skill is obtained and used, the fact remains that competence and "know-how" are qualities in which both employer and employe have a common interest. Her aim, therefore, must be one of helping both customer management and its operating people develop a better switchboard product through the use of methods best suited to switchboard work.

In the attainment of that objective, the Service Adviser is prepared to help the customer develop a training program that includes provision for evaluating the technical performance of the individual operator. However, this evaluation is secondary to the primary objective of developing sound operating ability; for such evaluation is not made from the standpoint of grading or rating, but rather with a plan to determine what the customer needs to know to supply the individual operator with the help she should have to improve ability and thus do a better service job.

The approach is one of helpfulness as distinct from rating and fault-finding. It functions through customer switchboard supervision. With it the development of a thoroughly competent operating force presents no difficulty. And it leaves the primary job, that of training, together with the evaluation of technical and non-technical qualifications, to customer supervision, where it belongs.

Such should be the policy of the Service Adviser on this subject. As is true with any policy, there may arise from time to time circumstances that warrant some deviation from the general rule. Any case of such nature should be referred to higher telephone company supervisory people for a detailed review of the condition before any commitment to vary from the policy is made.

Section 5

Telephone Courtesy Is Your Business

Phrases are the expression of thoughts. They should be as short as possible and still convey the idea without leaving a feeling of abruptness. When you do not use unnecessary words the essential details of the idea you are trying to get across will not be "side-tracked" from the main thought.

"Thank you," "Please," "I'm sorry" and similar trite phrases can be overworked until they leave with the listener the impression of studied formality, rather than a friendly personal conversation. Of course, such expressions have their place in telephone conversations, they are little courtesies some people dote upon. But, generally, they should be used only as one would use them in personal conversation.

The Service Adviser should give her entire attention when an attendant is talking. It should be made clear by her attitude and concern that she is interested and sympathetic to the matter being discussed. It is the Service Adviser's job to listen and to consider very carefully everything the other person is saying, so that she will thoroughly understand the difficulty and be able to give a forthright and convincing answer to his or her problem.

Advisers should adapt phrases to the person with whom they are talking. They should follow the person's manner of pronunciation but should not mimic personal, racial or sectional mannerisms. They should adopt phrases that suit their own personality. Some phrases sparkle when spoken by one person but "fall flat" when used by another.

One does not require a college education to speak good English. Watch and listen to those who speak well. Practice their choice of words and manner of speaking when expressing ideas. The results may be surprising.

Before a PBX attendant will listen to the Service Adviser she must not only have something of interest to say—she must be able to prove to the attendant that she is more proficient at the art of giving good telephone service than is the attendant. The Service Adviser should impress upon the attendant as forcefully as possible that she can and will do

more to help her in her work as a PBX attendant than anyone else can.

The Service Adviser should be sure her good-will is on the level. Most people can detect insincerity. When the PBX folks realize the Service Adviser is honestly sincere in her desire to help them, the rest will come easy—the Service Adviser will get co-operation and in return, the PBX folks will get the good service that means so much to the success of their business.

Bad telephone manners, and that includes bad telephone technique, start irritation cycles. An unjust snarl on a telephone will cause the recipient to growl at the next person who crosses her path and, in a chain-letter fashion, the provoking train of ill-nature goes on and on. Conversely, a pleasant conversation will spread many smiles and much sunshine along the way. A slight change in a point of view or attitude may send happiness rushing down all the telephone lines leading from the PBX switchboard.

The spirit of the PBX attendant is a grand object lesson for everyone in her organization. She has trained herself to remain composed under fire, to handle any situation her job calls for no matter what obstacle may confront her.

She is a past master in giving the answer that turneth away wrath. The wise attendant knows that personality goes over the wire as vividly as it does when people are speaking face to face, and she makes the most of this knowledge. She has learned that every time she accommodates a customer, she is adding to her company's business and that eventually puts more money in her pay envelope.

The good PBX attendant gets a lot of fun out of her work. She really puts her heart into the service she gives and gets much personal satisfaction in watching out for the people who use her telephone facilities.

Telephone manners begin at home. Some people we contact by telephone make us glad we called because they are courteous and show interest. Others we call only when we have to. You know the kind. They treat us in a more or less perfunctory fashion and leave the impression that they are conferring a favor by taking the time to talk with us.

(Section 5 to be continued next week)

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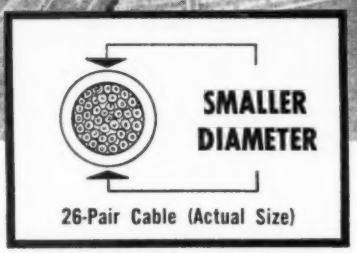

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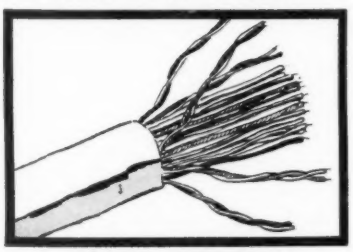

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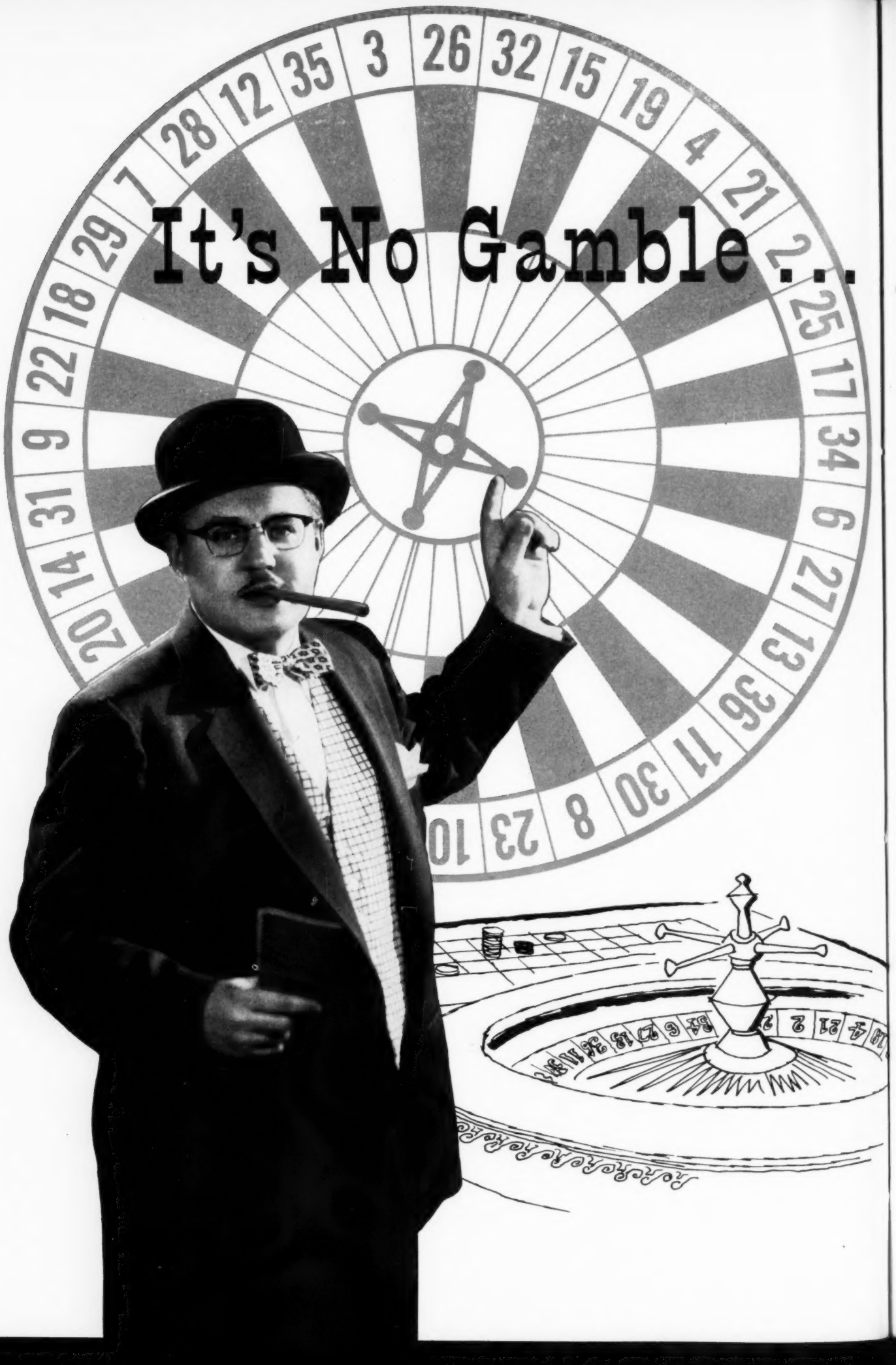

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Courts and Commissions

Pennsylvania House Passes Utility Law Revision Bill

Proposed state public utility regulatory law revisions backed by Governor Leader were passed in watered-down form by the Pennsylvania House of Representatives on Mar. 13, and sent to the state senate.

Under the bill as amended, the Pennsylvania Public Utility Commission would be forced to hold hearings only when proposed rate increases amount to 1 per cent of the company's total revenue, or if they will boost the annual cost of service to 5 per cent or more of the company's customers.

In its original form, the bill would have required public hearings in all rate change cases. The commission now conducts hearings at its discretion.

Another change in the bill as approved by the House would authorize the Commission to suspend any rate increase for up to one year. At present the maximum is an original suspension of nine months and an additional three month's suspension if needed to complete its investigations.

The bill's provisions on public hearings would permit the commission to waive them if the total increase is less than $5,000 a year.

In cases where public hearings are required, the commission would have to start them between 60 and 90 days after filing of the proposed schedule.

Another proposed provision would direct the commission, when it suspended a rate revision, to "consider the effect of such suspension in finally determining and prescribing the rates to be charged."

A change in the original bill would have the commission, upon deciding a proposed tariff is unlawful, determine the lawful rates and fix them by order. At present the utility itself revises its proposed rate changes if the commission has turned down the entire increase.

The bill, as given House passage, contained no mention of the controversial method of "fair value" determination. The commission now figures fair value at somewhere between original cost and the cost of replacement at current costs, less depreciation. Governor Leader's administration first proposed a change to define it as the original cost less depreciation.

Brennan To Be Rate Expert For Nebraska Commission

C. L. Brennan of Freeport, Ill., will become traffic rate expert of the Nebraska Railway Commission, effective Apr. 1. He succeeds Byron Cahill, who resigned after 19 years with the commission to accept a position with the Interstate Commerce Commission.

Mr. Brennan was born and received his high school education in Minnesota and later attended a special traffic school after serving in World War II. He has served in the traffic departments of the Chicago & Northwestern Railroad Co. at Omaha and the Santa Fe at Milwaukee. Before moving to Freeport, where he is with a toy company, he was employed by the Skogmo-Gamble Co. at Fremont, Neb.

Mich. Independent Receives Approval for Rate Raise

Don Carlson, general manager of the Morenci (Mich.) Home Telephone Co., has announced rate increases which became effective Mar. 1.

The Michigan Public Service Commission approved increases amounting to 60 per cent of the increase asked by the company, Mr. Carlson said.

The new rates are:

One-party business	$7.00
Two-party business	5.50
Five-party rural business	5.25
Ten-party rural business	4.75
One-party residence	4.00
Four-party residence	3.25
Five-party rural residence	3.40
Ten-party rural residence	3.00

Asks Kansas Rate Authority

The Kansas Corporation Commission on Feb. 17 was to hear the application of the Madison Telephone Exchange for authority to change rates, it was reported recently.

Plea of Switchers for Toll Compensation Denied in Wis.

The Wisconsin Public Service Commission has held that telephone companies are not required to pay toll compensation to switchline companies they serve.

In a decision dismissing a complaint brought by several Wisconsin switchers against commercial companies which perform their switching for them, the commission said in part:

"The complaints are that the switched company should be entitled to compensation from the switching company for their costs of billing and collecting toll revenue from calls placed by its customers and for the toll use of the facilities that it owns.

"The switching companies contend that the flat-rate charge for service constitutes a complete settlement between the companies for the interexchange of service both local exchange and toll; that current switching rates are less than the full cost of providing the service; that if payments to cover toll costs are required, an increase in the switching rate would be necessary; and that in connection with such proceedings they would expect to recover their full costs through a higher rate for service to the switched companies.

"After careful consideration, the commission has determined that the evidence is inconclusive that the switched companies would receive any over-all rate benefits if we were to require the switching companies to pay toll compensation.

"Under the circumstances we shall dismiss the proceeding without prejudice."

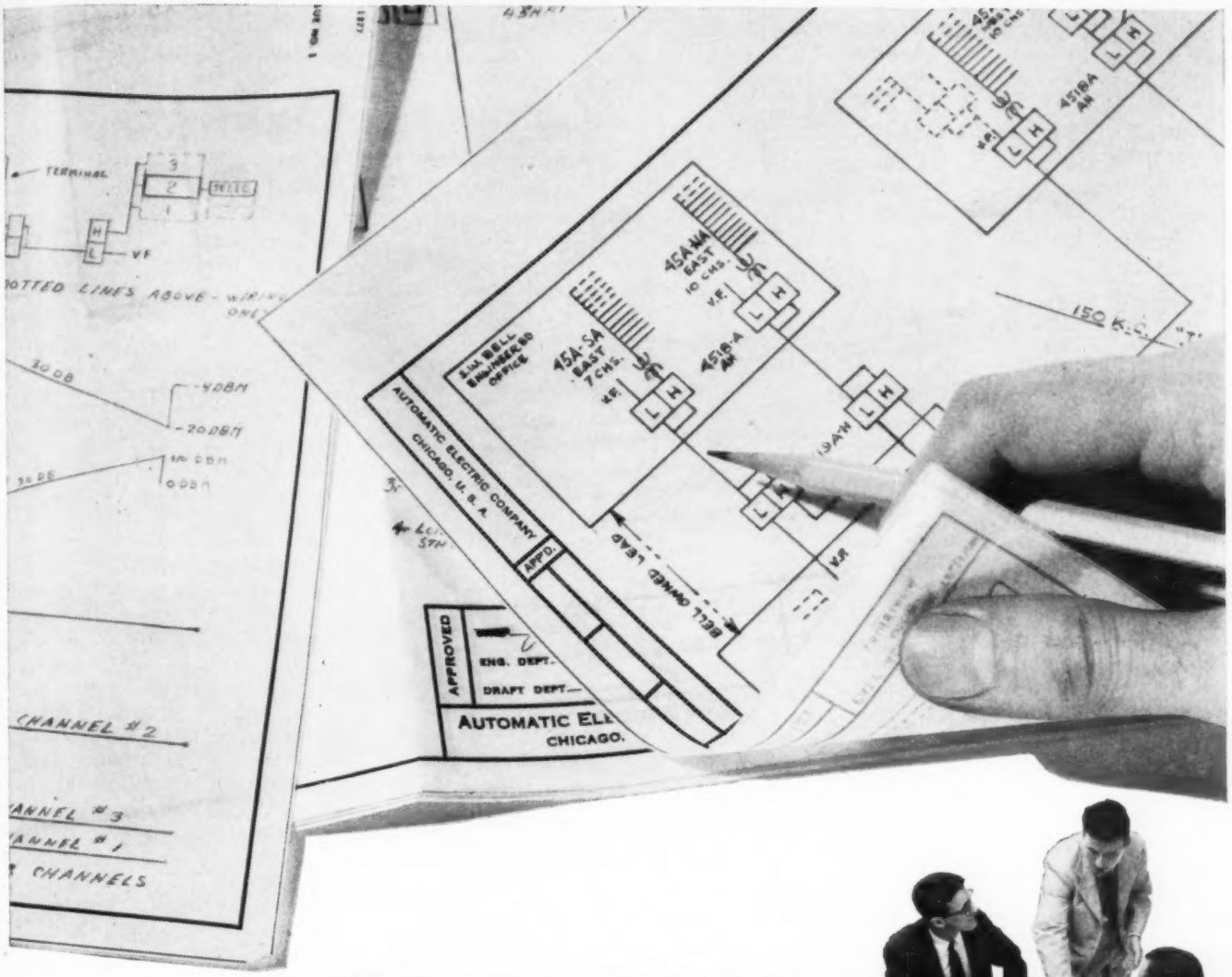
OKs Telephone Answering, Loud Speaking Rates in Neb.

The Nebraska Railway Commission on Mar. 6 approved applications of the Nebraska Continental Telephone Co., Columbus, for tariffs covering automatic answering and recording service and loud speaking telephone sets.

An installation charge of $15 and a monthly rate of $10 was authorized for "automatic answering only" service in all exchanges.

A monthly rental of $5.00 in addition to charges for main, extension or private branch exchange stations was ap-

(Please turn to page 40)



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proved for "loud speaking telephone sets." These provide a small microphone in the base of the telephone and a loud speaker operated on commercial power, and permit the use of the telephone without raising the handpiece.

The company stated that demands by customers for these services prompted the filing of the applications.

Bond Issue Authorized for Chillicothe (O.) Company

The Chillicothe Telephone Co. on Mar. 21 received authority from the Ohio Public Utilities Commission to issue and sell for cash to residents of the state of Ohio only, its 20-year 4½ per cent debentures, Series B, in the aggregate principal amount of $100,000, at a price equal to the principal amount thereof, plus accrued interest, if any.

Proceeds from the sale of the debentures are to be used to reimburse the company's treasury, for capital expenditures.

Wyoming Independent Seeks To Buy Another Company

Tri-County Telephone Association and the Paint Rock Telephone Co. have filed matching petitions with the Wyoming Public Service Commission seeking permission for Tri-County to purchase the Paint Rock Co.'s facilities, it was reported recently.

Paint Rock Telephone Co. presently owns a 22-mile toll line to Manderson and a manually operated switchboard at Hyattville serving 19 subscribers.

If the sale is approved, Tri-County will replace the existing facilities with an automatic system.

AT&T Directors Approve $250,000,000 Bond Issue

Directors of American Telephone & Telegraph Co. on Mar. 21 authorized a new bond issue of 250 million dollars to be offered at competitive bidding. It is expected that the bonds will be sold sometime after the middle of June.

The last debt issue of this kind offered by the company was in September 1954, when a 250-million-dollar issue was sold. Proceeds of the new issue will be used for additions and improvements to Bell System telephone service for the nation.

Mo. Exchange To Be Sold

It was recently reported that the Martinsburg, Mo., exchange of the F.&M. Telephone Co., Farber, is to be sold to W. R. Buchanan of Bowling Green, according to Mr. and Mrs. Don S. Crow, present owners of the company. The sale does not include the Farber exchange, also owned by the Crows. Mr. Buchanan is owner of the Silex & Eolia Telephone Co., Silex.

Corporation Formed to Buy Three New York Companies

Officers of Dryden Telephone Corp. announced on Mar. 1 that authorization has been given by the New York Public Service Commission for the acquisition of a controlling interest in the stock of the Dryden company by Independent Telephone Corp., a New York corporation recently organized to acquire and hold the stocks of telephone companies in New York and other states.

The commission's order also authorized the acquisition by the new holding company of controlling interests in Allegany Telephone Co., Inc. of Alfred, and Sanborn Telephone Co., Inc.

The new corporation will make its headquarters in Dryden.

W. Bradford Harrison, president of Dryden Telephone Corp., is secretary and treasurer of Independent Telephone Corp. William B. Harrison of Alfred, president of Allegany Telephone Co., Inc., will be president of the new parent corporation. Directors of Independent are Harrison, W. Bradford Harrison, and Adrian C. Leiby, Donald S. Stralem and Pierre Stralem of New York City.

Independent Telephone Corp. plans to continue the local managements and directorates of the subsidiary operating companies, but to centralize construction and maintenance services, accounting and billing procedures, and financing services at the parent company's main office.

An important function of the holding company will be to provide equity money for stock investment in the operating companies.

The initial acquisition of stocks of the Dryden, Allegany and Sanborn companies will be accomplished by an exchange of common stock of Independent Telephone Corp. for the holdings of William Harrison and W. Bradford Harrison in the common stocks of the three operating companies.

An offer will be made by Independent to all other holders of shares of the common stocks of the Dryden, Allegany and Sanborn companies to exchange their shares for common stock of Independent Telephone Corp. on the same ratios as were available to the Harrisons.

Asks Note, Stock OK in N. Y.

The New York Public Service Commission was to hear on Mar. 29, the petition of Cassadaga Telephone Corp. for authority to issue $125,000 of 4½ per cent 20-year notes secured by a first mortgage, and 200 shares of no par value common stock at $40 per share.

N.Y. Assembly Passes "Original Cost" Bill

The New York State Assembly passed and sent to the Senate a bill giving the New York Public Service Commission the right to determine telephone rate increases on a rate base of original cost of plant—the same basis on which New York gas and electric utility rates are fixed.

The bill grew out of the recent decision of the New York Court of Appeals, which held that the New York commission must consider current fair value in fixing telephone rates, and that the commission improperly rejected evidence of such value in denying a 68.5-million-dollar rate increase originally sought by the New York Telephone Co. (TELEPHONY, Feb. 25, p. 36).

Keith McHugh, president of New York Telephone Co., testified before a legislative committee that adoption of the bill which has the backing of the public service commission, would be a long step towards dooming telephone service to the "unhappy company" of the financially distressed Long Island Railroad and the New York city subway system (TELEPHONY, Mar. 24, p. 31).

The New York legislature was due to adjourn last week, and the week before the bill was still in the state senate finance committee. If it emerged in time for floor vote, it was likely to be passed and Governor Harriman was certain to sign it. He had indicated that he is in favor of such legislation.

Mr. McHugh told the senate finance committee that the proposal "would work an immediate injustice on all who have invested in the telephone business in this state." He noted that in nine of the last 15 years, the New York Telephone Co. has failed to earn enough to cover its regular dividends.

Change Kan.-Mo. Meeting Site

Site for the joint convention of the Kansas and Missouri Telephone Associations has been changed to the Town House Hotel, Kansas City, Kan., from the Hotel Muehlebach, Kansas City, Mo. The June 4 and 5, 1956, dates stand—only the location is changed.

Appoint Receiver in Kansas

The Rose Hill (Kan.) Telephone Co. has gone into receivership, C. V. Pickett, receiver, said recently. It was also stated that Southwestern Bell Telephone Co. will furnish Rose Hill service.

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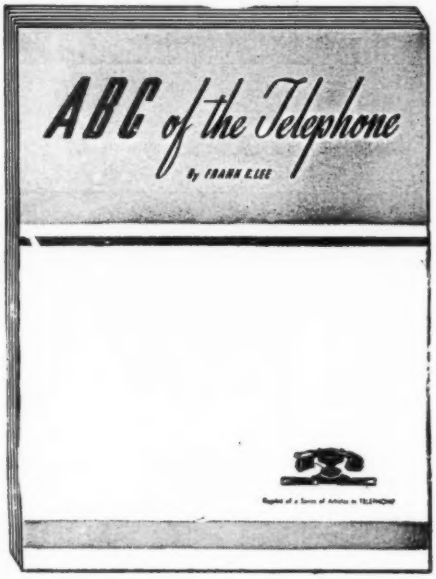

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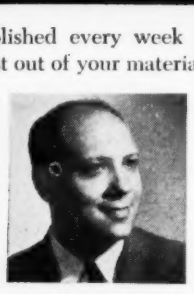
- **These two**
- **Insure your power**
- **Cut guying costs**
- **Protect sub-stations**

Published every week to help you get the most out of your materials and supplies dollar

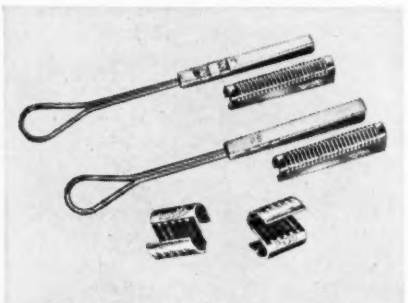


by C. J. Reynolds, Stromberg-Carlson Company

Two dividends are yours when you order supplies from Stromberg-Carlson. First, you get the protection of a double guarantee—ours and the maker's. This assures you of getting the finest products, backed by our 62-year reputation. Second, your support is used to further the art of telephony. We're knee-deep in this industry as a full-time job, not a side line, and your supply business plays a big part and helps us continue our research for new and better telephone equipment.

Let drop wires swing free at support—they'll last longer

You prolong the life of drop wires when you use clamps that let the wire swing free at the support.



Type "PS" gives extra support for smaller wires. "D" clip is for snub attachments.

Such clamps are the Reliable Drop Wire Clamps offered by Stromberg-Carlson. These clamps give excellent support, eliminate sharp bends, and let you string and sag service drops before cutting wire.

Under load, they automatically tighten, assuring you a firm grip without damaging insulation of the wire.

FOUR TYPES are available:

Type "P"—for No. 17 or No. 18 AWG parallel.

Type "PS"—for No. 17 or No. 18 AWG dumbbell wire and most other construction to No. 20.

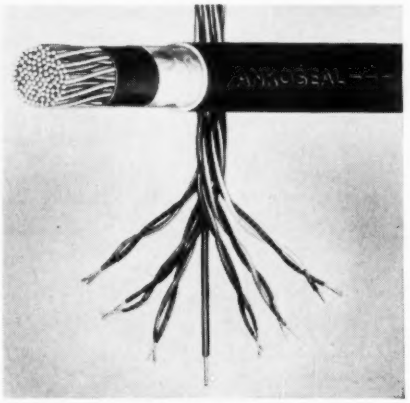
Type "PR"—for No.'s 14-16 AWG twisted pair and parallel suitable also for No.'s 17-18 reinforced parallel neoprene-jacketed drop wire.

"D" Clip—Used to secure drop wire to itself for snub attachments.

Choose from these 2 self-supporting cables

Yes, you **do** have a choice in self-supporting cables!

For standard exchange uses, you can get lots of service with the impervious, long-life PVC shield and jacket of Ankoseal type 775-P-SS. It's designed especially for permanent installations.

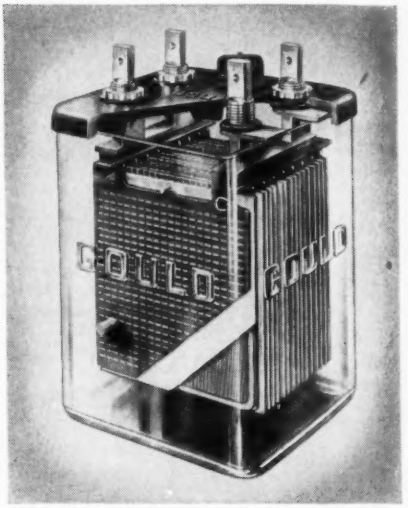


Exchange cable (top) and rural distribution wire are both easy to install.

And for temporary service, you can't beat the speed and low-cost installation of Ankoseal Rural Distribution Wire. Individual color-coded conductors, insulated with polyethylene with a PVC covering, are cabled around an insulated extra high strength galvanized steel support wire.

Insure your power supply

Because Planté batteries practically last forever... providing stand-by power that never fails... they're the best operating insurance you can buy. In switchgear, signal and alarm systems, or emergency light and power applications, these lead batteries have rolled up amazing performance records . . . are famous for their ability to deliver a powerful surge or a steady flow of current the instant it's needed.



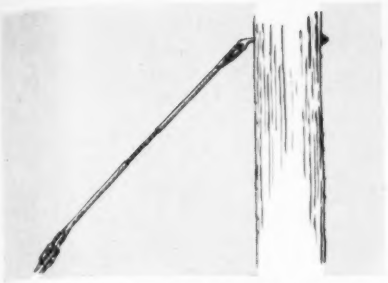
A sure, dependable supply of power when you need it. That, briefly, is the story of this Gould Planté battery.

Cut labor costs 50%, save 86c on each guy

How would you like to save as much as 50% of labor costs on guying? **And** save up to 86c on each guy strand, as well?

Preformed "Guy-Grips" eliminate the need for clamps, clips or loops, because each "Guy-Grip" provides its own loop-eye. This reduces the amount of strand you need. Total savings on a typical guy can go as high as 86 cents!

To install, almost all work is done on the ground – mostly by hand, using no special tools. You can often cut installing time in half!



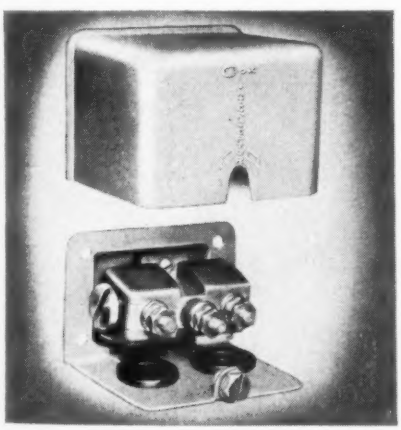
You hold the full strength of the strand with this Preformed "Guy-Grip."

Lab and field tests show that "Guy-Grips" will not allow the strand to slip, and are so strong that they can hold the full rated strength of even Extra-High-Strength Steel Strand.

The new Cook "Interceptor"

Lower Maintenance Costs—Sounds good, and it is! It's the new "Interceptor," a fuseless sub-station protector made by Cook Electric Company.

The "Interceptor" contains a Bakelite unit having heavy Everdur bussed circuits and ground studs, insert-moulded. It is compact and employs the protection characteristics of the Mini-Gap carbon-to-carbon arrester. There are two



"Interceptor" fuseless sub-station protector

Mini-Gaps used and they will pass, simultaneously, a current of 30 amperes for 15 minutes without destruction in accordance with Underwriters' requirements.

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Tax-Free Projects Costly To Nation-at-Large

A needed 400-million dollar hydro-electric project on the Niagara River in New York has been delayed for years for purely political and ideological reasons, the *Industrial News Review* reported on Mar. 26.

A group of taxpaying, publicly-regulated private utility companies has long ben ready to go ahead with it. But these utilities have been blocked by interests which want either the federal government or New York state to do the job. A bill favoring private-enterprise development has been given an enormous amount of support by newspapers, and by commercial, agricultural, labor, and civic organizations.

It once passed the House of Representatives by a wide margin, but that Congress adjourned before the Senate acted—and since then the "blockaders" have been successful in their delaying tactics.

An advocate of New York state development recently said that the power could be sold at about three mills by the state as against 4½ mills if private enterprise produced it. This claim was at once effectively answered. The 1½-mill difference would result in a theoretical saving of 12 million dollars a year on the 8 billion kilowatt hours of power the project would produce.

But, against that, private enterprise would pay water rentals and taxes totaling 23 million dollars a year—whereas public development would be tax free. So the question arises: "Where is there any public interest in benefiting certain groups to the extent of 12 million dollars a year and then penalizing others to the extent of 23 million dollars a year?"

This tax factor, the Review points out, is vitally important everywhere. The electric industry paid more than 1.6 billion dollars in taxes last year, about 1 billion dollars of it to the federal government. Every time a socialized, tax-free project comes into being, it means that all the rest of us must pay higher-than-necessary taxes to compensate for the loss, concludes the Review.

Party Line Tie-Up Involved In Florida Man's Death

A woman in Miami, Fla., who refused to quit talking on a party line while a neighbor tried frantically to telephone an ambulance for a dying heart attack victim recently, said "it was all a misunderstanding."

The stricken man, 86 years old, died a short time after being taken to a hospital.

The woman who had refused to get off the line, said she was "very upset" when she found out that it was an emergency call and that the man had died.

"It was all a misunderstanding. I was talking long distance when this woman got on the telephone, but she was yelling and so excited and my long distance party was talking and I couldn't understand what it was all about," she said.

The Jacksonville exchange of the Illinois Telephone Co. was recently converted from manual to automatic telephone service. Jacksonville is the second largest exchange of the company with about 8,500 stations. As part of the conversion program, this new modern exchange building was erected to house the automatic switching equipment. The Jacksonville exchange was engineered to be ready for eventual Direct Distance Dialing (DDD). As a result of the Jacksonville conversion, approximately 85 per cent of the company's telephones are automatic.

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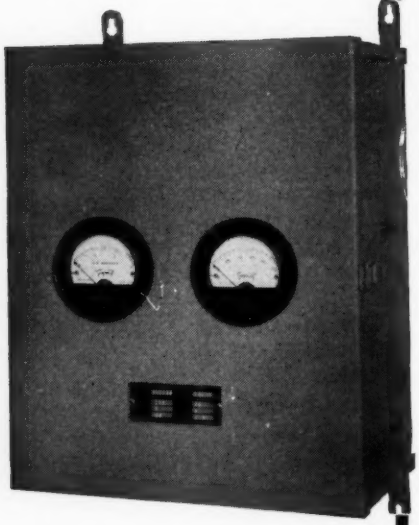
Dependable Power

for Years-
and Years-
and Years-
of Service!



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ELECTROX
BATTERY ELIMINATORS
BATTERY CHARGERS

In sizes and capacities to meet every telephone power requirement.

See your Schauer Jobber.
Write for Bulletin 1465.

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SCHAUER
MANUFACTURING CORP.

4514 Alpine Ave. Cinn. 36, Ohio

"Just as soon as a man got on the telephone and explained, I hung up immediately. I wouldn't think of delaying an emergency call."

The octogenarian collapsed from a heart attack in the front yard of the woman's neighbor. The neighbor said she tried to place an emergency call for 10 minutes but that the woman refused to stop talking.

Police obtained a warrant charging the defendant with disorderly conduct. She was to be tried in City Court.

Solar Research Newsletter Given World Distribution

The Association for Applied Solar Energy (204 Heard Building, Phoenix, Ariz.) is making initial world distribution of its newsletter, "The Sun at Work," it was announced on Mar. 26.

The quarterly publication will serve to establish and maintain contact among persons concerned with solar energy research. Its purpose is to publish news of association activities as well as information about people and developments in the broad field of solar research.

Guy Benveniste, Stanford Research Institute economist, is editor.

The first mailing of "The Sun at Work," consisting of 10,000 copies, will reach scientists, engineers, architects and industrialists in 37 countries. Many of these people had attended the World Symposium on Applied Solar Energy held last year in Phoenix.

The newsletter's name is derived from the title of the Solar Engineering Exhibit held in conjunction with the symposium.

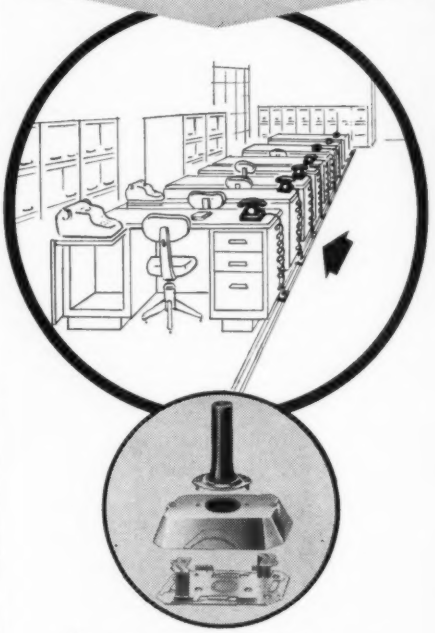
The association also has plans to issue "The Journal of Solar Energy Research" as a scientific publication for original papers and for extensive abstracts of contributions previously printed elsewhere.

Other current activities of the association include the operation of a solar energy library and the establishment of a museum of solar energy research.

Great Future for Teachers

"The teacher of tomorrow will be carefully selected, broadly trained and adequately paid. He will be the powerful force by which this nation will achieve the maturity of mind and the serenity of spirit that are the hallmarks of true greatness. He will have a new awareness of destiny and a new sense of calling. . . . Most of all, he will be recognized and honored among men as one to whom God has given a priceless opportunity to serve." — SAMUEL B. GOULD, *president of Antioch College.*

PANCAKE
is the
Modern Way
to carry
communications
wiring to the
point of use!



Pancake is the streamlined, modern method of making individual telephone connections to office desks or communication points in factories. The galvanized steel, *trip-proof* surface raceway can be quickly and economically installed with a *minimum* of interruption to office or factory routines.

Features added to the newly developed 1546T Telephone Outlet Box, *illustrated above,* provide (1) an ingress for 2600 Pancake, and (2) the "split bridge", which extends the versatility of this fitting, provides a more simple means for the installation of the 47B terminal block, and facilitates the use of the fitting for through wiring.

Specify 1500 Pancake for JKT Conductors; 2600 for telephone cable.

THE WIREMOLD COMPANY
HARTFORD 10, CONN.

General of Ohio Elects R. Rawlings Vice President

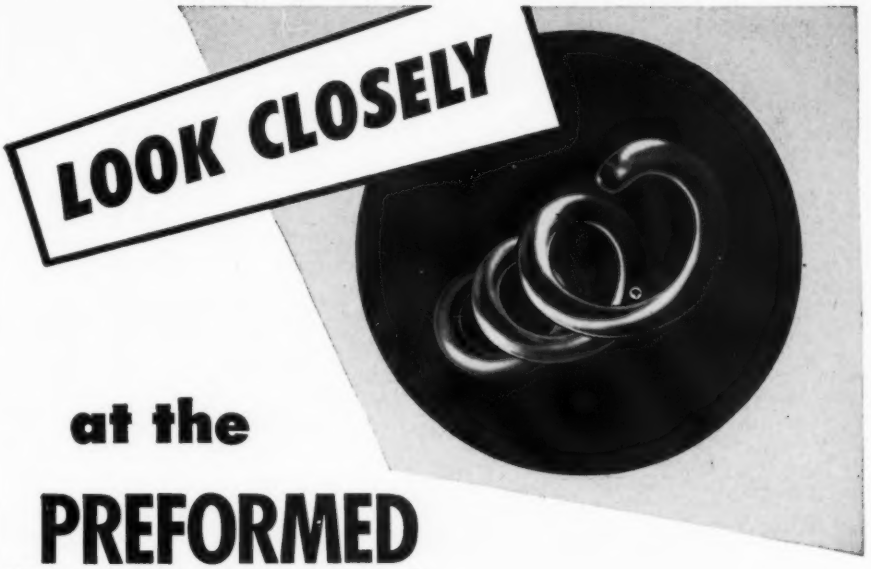
Richard H. Rawlings has been elected vice president of the General Telephone Co. of Ohio, it was announced on Feb. 24 by the company president, Clare E. Williams.

Mr. Rawlings has had a distinguished career in the telephone industry starting with the International Telephone & Telegraph Co. in 1927. After serving one year with that corporation, he was assigned to Uruguay, Argentina, and Chile, where his work involved toll transmission and installation of the first South American transcontinental telephone line.

R. H. RAWLINGS

From 1932 to 1935, he was engaged

If the young lady above seems to take quite an interest in communications, it's only natural under the circumstances! Telephones are a family affair: her mother is Mrs. K. W. Buck, an employe of the Beaufort, S. C., exchange of United Telephone Co. of the Carolinas, her grandmother is chief operator at the exchange, her grandfather is district manager. Her uncle, too, upholds tradition—he's an accountant with Southern Bell T&T.



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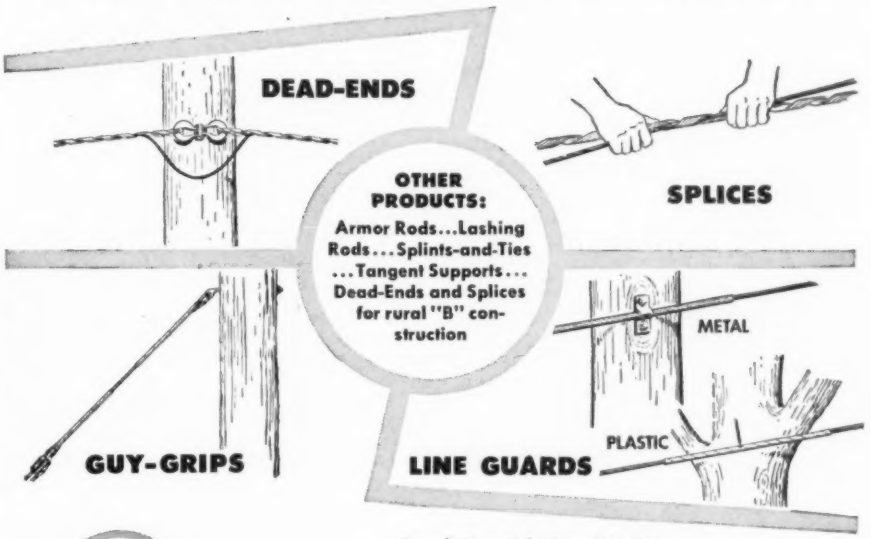
a major advance in line accessory fittings

The Preformed method of producing line accessories is an exclusive new development for the telephone industry. It incorporates the use of Preformed Rods—helically formed within exacting tolerances—to serve varied "fitting" functions all along the line. No more bolts—no compression tools—simplified construction. More than just something new, Preformed Products represent a better, faster and more economical way to *dead-end, splice, support,* or *protect* conductors and strands.

For more information on their exclusive advantages, consult your telephone distributor.

A COMPLETE LINE FOR THE TELEPHONE INDUSTRY...



Consult Your Telephone Distributor

Made in accordance with or for use under one or more of the following U. S. Patents: 2,275,019; 2,587, 521; 2,609,653; 2,691,865, other patents pending.

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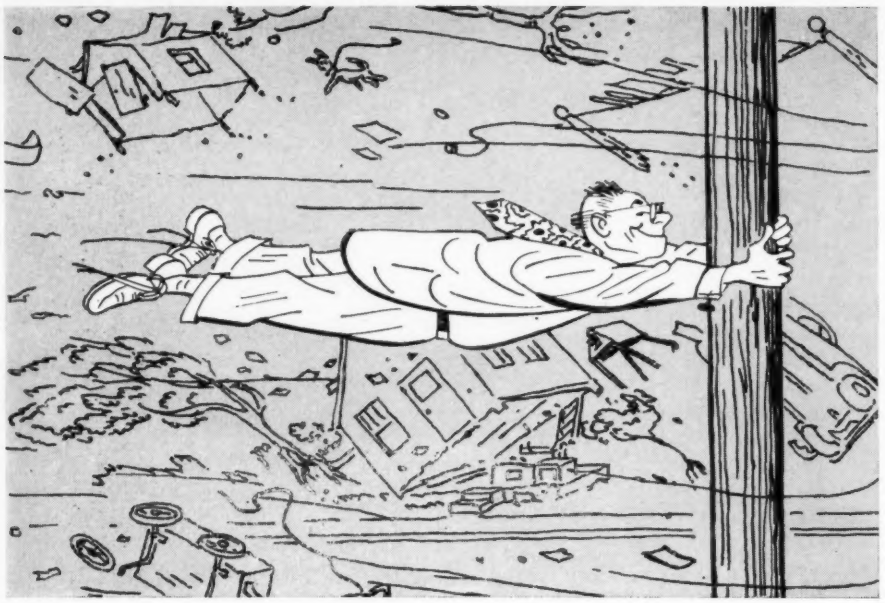

"Only thing standing—I'm lucky it's a **KOPPERS POLE!**"

KOPPERS

Koppers Poles are sturdy, even after years of use. Specify Koppers Pressure-Treated Poles for long, trouble-free service. Koppers Company, Inc., Wood Preserving Division, Pittsburgh 19, Pennsylvania.

PRESSURE-TREATED POLES

be on the ALERT

when it is so easy to install

SIGNAL

Telephone Ringing

RELAY SETS and accessory

SIGNAL

Equipment

Immediately Available **FOR CIVILIAN DEFENSE**

These Relay sets have already been installed in many leading communities for operation of Civilian Defense Alarms.

The SIGNAL Relay Set can be installed quickly and easily. It is designed to operate on standard telephone ringing current of 15 milliamperes at 90 volts, 20 cycles.

The Telephone Ringing Relay Set has been proved in service and is of the same high quality which characterizes all relays, devices, and control systems built by the Signal Engineering and Mfg. Co.

Sales Representatives in Principal Cities.

Write for Catalog TR-4

Wheelock RELAYS

SIGNAL

ENGINEERING & MFG. CO.

LONG BRANCH, NEW JERSEY

in engineering for Buenos Aires regional organization responsible for International Telephone & Telegraph properties in Argentine, Chile, Peru, Uruguay, and southern Brazil. In 1935, the corporation appointed him operating superintendent of Chile Telephone Co. In 1938, he became managing director of the Rio Grandense Telephone Co. in southern Brazil. In 1942, he became a director, in Rio de Janeiro, Brazil, of four International Telephone & Telegraph Brazilian subsidiaries.

Mr. Rawlings then became operations vice president of the Porto Rico Telephone Co., and in 1946, he was appointed operations vice president of the Cuban Telephone Co. and of the Radio Corp. of Cuba, subsidiaries of International Telephone & Telegraph Corp. In 1948, he accepted an assignment to Spain, where he was technical advisor to the Spanish National Telephone Co. He was also appointed a director of the Spanish Telephone Co. and of three International Telephone & Telegraph Spanish subsidiaries.

Mr. Rawlings was born in Rutland, O. He attended Harvard University, where he received an A.B. degree in Economics in 1925, and an S.B. degree in Electrical Engineering in 1927.

Obituaries

GLENN M. DWELLE, 81, manager of the Dwelle Telephone Co., Lake City, Minn., and a former director and president (1941 and 1942) of the Minnesota Telephone Association, died on Mar. 16 in Lake City.

G. M. DWELLE

Born in Lake City on Mar. 3, 1875, he established the first exchanges at Lake City, Hammond, Wabasha and Zumbro Falls, Minn., in 1897. In 1905 the company was incorporated as the Dwelle Telephone Co. Later he organ-

ized the Lake Pepin Telephone Co. with exchanges at Pepin, Maiden Rock and Plum City. The Wabasha Telephone Co. was also owned and run by him at one time.

In 1929 he became a director of the Lake City State Bank, was elected vice president in 1944 and president in 1946.

He became president of the Lake City water and light board in 1932, retiring from the presidency in April 1940, and resigning from the board in July of the same year.

He married Mary Satori of Wabasha in 1899 and had four children. She died in 1928 and in 1929 he married Edith Peterson, who passed away in 1947.

Surviving Mr. Dwelle are his four children, Joseph, Mrs. Harold Dirks of Olivia, Mrs. J. R. Miller of Minneapolis and Margaret Dwelle of Denver, Colo., and one sister, Floy Dwelle. He also leaves 12 grandchildren and 15 great-grandchildren.

AGNES V. GUSTAFSON, 54, formerly chief operator of The Lincoln Telephone & Telegraph Co. at Osceola and Dunbar, Neb., died on Mar. 9.

She was first employed by the company in 1923 as an operator at Osceola and became chief operator in 1931. When that exchange was converted to automatic in 1951, she moved to Dunbar as chief operator-cashier. She retired in April 1952 and returned to Osceola to make her home there. A member of the Frank H. Woods Chapter of the Independent Telephone Pioneer Association, she is survived by four sisters and two brothers.

North Dakota Company Votes To Merge With Another

The Amidon (N. D.) Telephone Co. voted to disband, it was reported recently, and merge with the Rural Telephone Association, after having been in business for about 46 years.

The company originally was a part of the Stillwater Telephone Co.

Asks Va. Exchange Raises

The Inter-Mountain Telephone Co., Bristol, Tenn., has applied to the Virginia Corporation Commission for a rate increase for its Virginia exchanges. The commission set a hearing on the application for Apr. 20.

Neb. Company Incorporates

The Garfield Telephone Co., Bertrand, filed articles of incorporation with the Nebraska Secretary of State on Mar. 17. The company is a nonprofit organization.

toll calls
TIMED TO THE SECOND
Automatically

This is the ultimate in modern, dependable and accurate computing of all toll calls TIMED TO THE SECOND. And what's more it's all done *automatically*—no need for operators to do it manually.

Just a flick of a lever, and Calculagraph computes, prints and records ELAPSED time of toll calls, thus eliminating human errors and allowing every operator to handle more calls—and more calls mean more dollars to you.

For time-saving operation, for dependable accuracy, for greater toll-call volume, install Calculagraphs on your switchboard. Investigate this model 33 shown here (others available according to need) and see for yourself what CALCULAGRAPH can do for you.
Don't delay, write today for catalog to Dept. T.

231 Photograph courtesy Lincoln (Neb.) Telephone and Telegraph Co. and Automatic Electric Sales Corp.

CALCULAGRAPH Company
HARRISON, N. J.
THE STANDARD OF ACCURACY SINCE 1892

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you can always depend on. For Klein tools and equipment are designed better for your jobs—made of the finest materials—individually tested and inspected. Look for the familiar Klein trade-mark—serving the electrical industry "since 1857."

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Write for your free copy of the Klein Pocket Tool Guide Today!

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Helpful Literature

INSIDE TELEPHONES—"10 Ways To Cut Costs With Inside Telephones," a new 12-page illustrated booklet, has been prepared by Automatic Electric Co.

The booklet tells how 10 different organizations, each in a different line of business, are saving money with PAX, the privately-owned, rent-free dial telephone system used exclusively for "inside" calls.

Quoting executives of these 10 firms, the pamphlet explains the role of this telephone system, separate from the public telephone service, in stepping up production, saving man hours, cutting costs, improving customer relations, and effecting further company benefits. Request HL274.

•

VOICE FREQUENCY REPEATERS—Automatic Electric also is distributing a new circular on its AT-2 and AT-3 transistorized, negative impedance voice frequency repeaters which were developed to improve transmission on telephone circuits without using heavier cable, wire or cable loading.

The AT-2 is a series type transistorized repeater, and the AT-3 is the shunt type. The shunt type normally is used with the series type and rarely alone, whereas the series type is used extensively by itself.

The circular describes the characteristics of both repeaters and the jobs each will perform in the exchange plant, including how transistorized repeaters can be used on PBX tie lines, long tandem trunks, toll completing or tributary trunks, etc. A supplementary technical brochure describes typical applications requiring the AT-2 alone, others where both the AT-2 and AT-3 are required, and still others where negative impedance repeaters are not recommended. Request HL275.

•

PRIVATE AUTOMATIC SYSTEMS—A new data file on automatic private communication systems has been released by North Electric Co. It describes in detail a wide variety of automatic telephone systems designed for private use under the North trade name "Privatel."

This is a combination descriptive bulletin and file folder. It contains a general discussion of private automatic telephone systems, and descriptions of the special features available with "Privatel" exchanges, from conference calling and centralized dictation controls to code calling and watchman's call reporting.

Separate data sheets are provided for each of six sizes of switchboards covering requirements all the way from 10 lines on a single link to hundreds of lines engineered for industrial or institutional applications. There are included separate specification sheets for each type of switchboard, enabling an architect or contractor to conveniently fill in the communications portion in a set of general specifications. An additional data sheet describes the types of telephones available with the North systems and the dictation control trunks applicable to most "Privatel" units. Request HL276.

•

RELAYS—Relays of the same types that have given long and reliable service in telephony over the past half-century now are being made available

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Please have the manufacturer send me without obligation further information on the products described in the following numbers:

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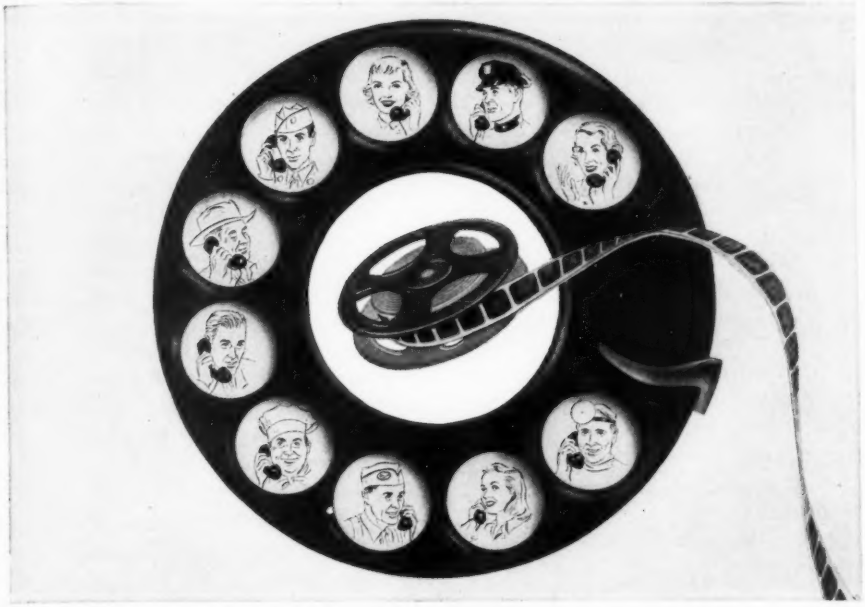

MICROFILM REDUCES TOLL BILLING COSTS

for Citizens Telephone Co. of Decatur, Indiana

Toll Statement Handling Reduced

Now Citizens Telephone Company quickly makes a microfilm record of the original toll tickets, and mails the originals to the customer along with the bill. Eliminated is the need for posting individual toll calls on the statement with "date called," "town called," etc. A single total charge for all toll calls is posted; the original toll tickets, returned with the statement, verify separate calls and charges. A 60% saving in labor has thus been accomplished with the new microfilm system.

Ticket storage and filing operations are also eliminated with sizable savings in labor! Microfilm records for nearly 2½ years of operation are now stored in less space than was formerly needed for filing toll tickets for a 6-month period.

Administrative savings the first year of operation paid for the microfilm equipment. What's more, the new method of handling toll tickets has brought about improved service to subscribers. Microfilming the Remington Rand way brings fast, accurate billing at reduced cost! For details, Circle CH842.

Electric Typing Pays Big Dividends

Change now to this most modern method of electric typing and like thousands of other Remington Electric Typewriter owners you'll gain big dividends.

Typing production increases of 20%...30%...even as high as 50% have been made on the Remington Electric. You turn out more work in less time and with less effort.

And now, any of 6 new decorator colors blend the Remington Electric into your office setting – a smart attraction for the public's view. Circle RE8612 Rev. 1 and RE8764.

Make Fast, Accurate, Economical Copies of Any Record

From start to a finished print...in a minute or less – Transcopy Duplex does it all...exposes, develops, prints! Transcopy is the most compact, convenient, clean way of making copies of any record written, printed or drawn, one or two sides, opaque or translucent.

And now, with Transcopy you can use the Remington Rand *Foto-Note* technique for answering intra-company communications. Instead of dictating your answers, a handwritten reply made right on the original is photocopied quickly, easily, clearly and economically on Transcopy...and forwarded to its proper destination. You save time – yours and your secretary's – filing space, labor and even money. Circle P427 and P401.

Remington Rand

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CH842 P427 and P401

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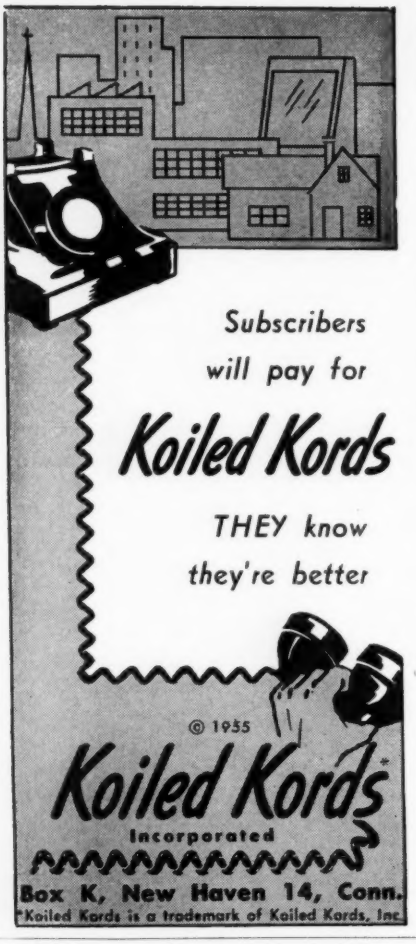


for industrial applications by Stromberg-Carlson, a division of General Dynamics Corp. The company has issued a brochure describing the various relays.

The Stromberg-Carlson relays are available in six general types, most of them with a number of variations.

Type A relays are single-coil with double-stacked spring combinations. Fast acting relays of this type have operate times ranging from .008 to .020 second, and release times of the same order. Slow-acting constructions also are available, to provide a wide range of slow operate and slow release characteristics.

Type A relays can be supplied with one or two snap-action switches having Form A, B, or C spring combinations, or with one snap-action switch and one spring pile-up. The switches are enclosed, heavy-duty types for switching loads up to 10 amperes, 115 volts AC.

Relay-rectifier combinations provide the operating and physical characteristics of a Type A direct current relay with operation by 110-volt alternating current through use of a compact selenium rectifier. This arrangement allows larger spring pile-ups than can be used on relays operated directly on AC.

All Type A relays also can be supplied with plug-in connections of the radio type, for use with commercial radio-type sockets with 8, 9, 12, or 20 connections; of the Jones type with up to 24 connections, and of the Stromberg-Carlson type with up to 36 connections. The Stromberg-Carlson plug-in mounting automatically locks in place without screws, and assures a low resistance connection.

Stromberg-Carlson type B relays are gang-type relays with up to 60 Form A contacts. They are supplied with one or two coils, as determined by load requirements and operating voltage.

Type C relays are essentially two relays mounted on a common frame, so that one Type C relay can be mounted in the same space as a Type A relay. There are two coils, and two armatures, each operating one side of a double-stacked pile-up.

All Stromberg-Carlson Type A, B, and C relays can be obtained with either taper-tab or solder type contact and coil terminations.

Type D relays have been designed for use where a small, lightweight, shock-resistant relay is required. Stromberg-Carlson Type D relays withstand shocks up to 50 G's, and, when energized, will remain operated under shocks of 20 G's. They can be obtained with slow operate and slow release characteristics if desired.

Types 3A and 3B relays are vibrating reed types, for providing alternating current from a direct current source. These relays can be used in conjunction with slow release relays to produce extended relay release, or they can be wired in self-interrupting circuits to produce time pulses.

Stromberg-Carlson Type 340 relays are double coil polar relays of the permanent magnet type. They are sensitive to low currents, and are generally used for reverse-battery supervision and signaling. Coils on the Type 349 relay are double-wound, and thus this type can be used for high-low supervision.

Stromberg-Carlson relays are available with twin dome contacts of silver or palladium, twin crossbar contacts of palladium bi-metal, or single button-type contacts of silver tungsten carbide. The choice of contacts depends on the operating conditions.

Springs of Stromberg-Carlson relays are nickel silver, of the flat cantilever type. They are accurately pre-formed prior to assembly on a specially-developed machine that automatically establishes the amount of pre-form in each spring by weight. The springs are interleaved with high-grade phenolic insulators that are cured prior to assembly, and are held securely in posi-

"YANKEE" TOOLS for Telephone Service

SERVICE IS THEIR BUSINESS, TOO!

No. 2150 Bit Extension —bits will not loosen or jam in socket. Takes large range of bits. Chromium plated.

No. 2101 Bit Brace— with smooth, positive ratchet action, quick-centering ball bearing chuck and patented sweep action (no play or binding), unbreakable hard rubber handles.

No. 130A Spiral Driver —the driver that *turns* while you *push*. Easy to operate, powerful, it tightens or loosens screws and small nuts quickly and easily.

No. 41 Push Drill ("100 PLUS") all-metal, highly finished. Magazine handle holds eight drills, from 1/16" to 11/64".

In the enviable reputation for good service that the telephone companies have earned, the contribution made by linemen and maintenance men is outstanding. And we at "YANKEE" are proud of the part "YANKEE" TOOLS have played in this achievement. For over 50 years "YANKEE" TOOLS have been "standard equipment" with service men. And every year more and more go into telephone service.

THE TOOL BOX OF THE WORLD

STANLEY

YANKEE TOOLS
Division of Stanley Tools
Dep't. 2103, Philadelphia 33, Pa.

tion by high tensile screws tightened to a specific torque. Moveable springs are actuated by a continuous phenolic pusher which provides independent movement of each spring, thus minimizing wear through even distribution.

All types of relays are available with tropicalization, if required. Request HL277.

•

EARTH BORER—How to dig holes easily and rapidly is the subject of a new catalog on the 4401-H portable hydraulic earth borer, recently issued by J. H. Holan Corp.

The four-page catalog has line sketches, close-up views of construction and action photos of the new Holan digger. The unit bores holes 8 to 20 inches in diameter and up to 8 feet deep. A variety of cutter heads is available. Request HL278.

•

HYDRAULIC LADDER—The Holan Corporation also has issued a catalog explaining the features of its new Series 2500 ladder. The new manually-operated hydraulic ladder can be elevated and spotted with the fly section extended. It can be lowered automatically by turning a valve handle. The ladder features a new light weight tubular support frame, a new location for the rotation crank, a two-speed elevation pump, a band-type brake for controlling ladder retraction and many new safety devices. Request HL279.

General System Announces Organization Changes

Several organizational changes within General Telephone System were made public on Mar. 21 by Donald C. Power, president.

Louis H. Meyer, now president of General Telephone Co. of Michigan, will become president of General Telephone Co. of Indiana, Lafayette, effective Apr. 16. In addition, on May 1, he will become president of the Citizens Independent Telephone Co., Terre Haute, Ind., and the Home Telephone & Telegraph Co., Fort Wayne, Ind.

T. Austin Saunders, president of Union Telephone Co., Owosso, Mich., will become president of General Telephone Co. of Michigan, effective Apr. 1, with headquarters at Muskegon. He will continue as president of the Union Telephone Co.

Herbert E. Hussey, now president of General Telephone Co. of Indiana, will become chairman of the board and chief executive officer of General Telephone Co. of the Southeast, Bluefield, W. Va., on Apr. 16. Effective Apr. 20, he will become chairman of the board and chief

LOOK TO
LINDSAY
FOR
service

• Fast
• Efficient
• Personalized

. . . and look to Lindsay for *everything* in nationally known telephone supplies, delivered as ordered and on time with absolute reliability. It is a matter of personal pride with us to make—and fulfill—service promises beyond your expectations.
***Phone or write for immediate delivery or required data.

THE LINDSAY TELEPHONE SUPPLY CO.
10409 Meech Ave., Cleveland 5, Ohio
Tel. Diamond 1-9212

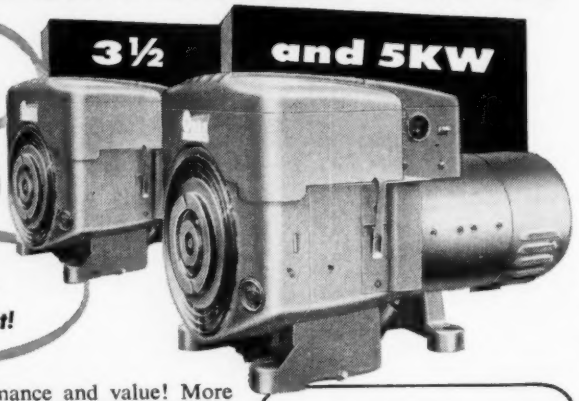
XUM

New ONAN CCK Electric Plants

MORE OUTPUT *per pound of weight!*

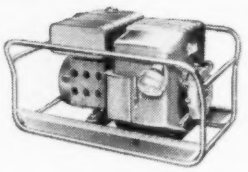
MORE OUTPUT *per gallon of fuel!*

MORE OUTPUT *per dollar cost!*



Way ahead in performance and value! More powerful, two-cylinder, air cooled Onan gasoline engines of 4-cycle, horizontally-opposed design give smooth, quieter, effortless performance. Short stroke and moderate speed cut engine wear, give longer life. Quality features include rotating Stellite-faced exhaust valves, solid Stellite valve seat inserts, full pressure lubrication. Onan's exclusive Vacu-Flo cooling system available for difficult or "buried" installations.

Completely Onan-built, with Onan gasoline engines direct-connected to Onan all-climate generators in compact, rugged units. Available in stationary, portable and standby models with a wide range of accessories.



PORTABLE MODELS
Available with carrying frames or 2-wheel dollies. Easily portable. Other Onan portable models: 500 to 10,000 watts.

Write for folder on all CCK models

Onan ELECTRIC PLANTS

D. W. ONAN & SONS INC.

3870 University Avenue Southeast, Minneapolis 14, Minnesota

CONTINUING IMPROVEMENTS IN THE

Murphy "ONE-MAN" Cable Tester

MODEL TTB

MODEL CMUW

ONE MAN WORKING ALONE

Can Now Identify Non-Working Cable Pairs 3 times faster than 2 men working together.

DISTANCE:
2 feet to 40 miles

The *Combination Tag-and-Terminating Board*, showing cable pairs properly connected. Tips — Horizontally, RINGS—Vertically.

The NEW MODEL CMUW
The new weatherproof gasket sealed case is now a part of every MODEL C shipped.

WE SELL DIRECT ONLY TO DOMESTIC CUSTOMERS
Foreign Customers See Your Export Agent or Write Us

MURPHY ENGINEERING LABORATORIES, INC.
4419 Tulsa **Houston 24, Texas**

executive officer of South Carolina Telephone Co., Sumter, S. C., and the Sumter Telephone Co. Also on Apr. 20 he will become president of Durham (N. C.) Telephone Co., Southern Continental Telephone Co., Cookeville, Tenn., and Georgia Continental Telephone Co., Monroe, Ga. Mr. Hussey will make his headquarters at Durham.

Gilbert A. Klein will become operating vice president of all the companies in which Mr. Hussey is chairman of the board or president.

T. Holden Moran will become president of Community Telephone Co. of Wisconsin, Black River Falls, and the St. Croix Valley Telephone Co., St. Croix Falls, Wis., effective Mar. 30, in addition to holding the office of president of the General Telephone Co. of Wisconsin, Madison. On the same date, H. P. Siebken will become operating vice president of Community Telephone Co. of Wisconsin and L. T. Olcott will become vice president of St. Croix Valley Telephone Co.

Clare E. Williams will become president of the Ohio Consolidated Telephone Co., Portsmouth, O., effective Mar. 21, in addition to holding the office of president of the General Telephone Co. of Ohio, Marion. Allen S. Crane will become operating vice president of General Telephone Co. of Ohio, effective Apr. 1.

Richard N. Cole has become vice president of the Ohio Consolidated Telephone Co. and will be in charge of operations of that company, with his headquarters at Portsmouth, effective Mar. 21.

Emmett N. Swanson, now president of The Home Telephone & Telegraph Co., and the Citizens Independent Telephone Co., will become operating vice president of General Telephone Co. of Pennsylvania, Erie, effective May 1.

USITA National Advertising Cited for Achievement

The United States Independent Telephone Association has been presented a certificate of honor award for "an outstanding achievement in bringing about a better understanding of the American way of life during 1955" by the Freedoms Foundation, Valley Forge, Pa.

The award was conferred in recognition of the messages carried by the USITA's nationally circulated advertisements in *Time* magazine, *U. S. News & World Reports*, *Better Farming* and *Farm Journal*, and the industry's trade publications.

The presentations to award winners in the Washington, D. C. area were made during an impressive and color-

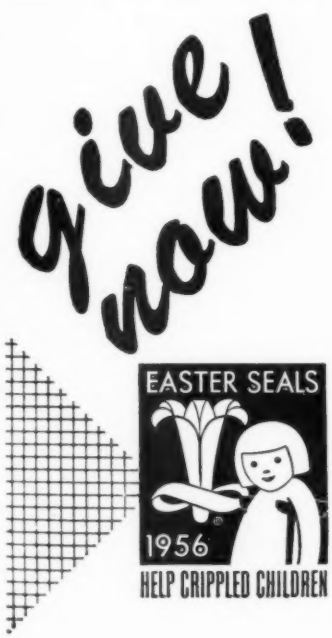
ful ceremony on Mar. 16, in the old Supreme Court Chambers in the Senate wing of the Capitol.

Leon F. Roberts, USITA director of information, represented the USITA and responded appropriately to the award presentation. Other recipients of awards who were present for the ceremonies included Vice President Richard M. Nixon; Clare Booth Luce, ambassador to Italy, and Boyd Campbell, president of the U. S. Chamber of Commerce, each of whom received awards for individual achievement.

This is the second time that USITA's national advertising campaign has received recognition. Last August, the USITA was one of the 10 runners-up for top awards out of a total of more than 200 campaigns which were studied and screened during the judging for *The Saturday Review of Literature* awards presented for "distinguished advertising in the public interest."

To Head N. C. Corporation

A. William McDonald, for the past five years manager of the Guilford Telephone Co., Guilford College, N. C., has resigned to become manager of the Yadkin Valley Telephone Membership Corp., Yadkinville, N. C. His successor has not been named.



THE NATIONAL SOCIETY FOR CRIPPLED CHILDREN AND ADULTS, INC.
11 S. LASALLE STREET, CHICAGO 3, ILL.

Quick, dependable carrier measurements—3 to 500 kc

New Model 104 Carrier Frequency Voltmeter—5 to 150 kc

Four Frequency-Selective Voltmeters

Four precision frequency-selective voltmeters for carrier system measurements are now offered by Sierra. Including the new Model 104, these instruments cover all frequencies 3 to 500 kc. They provide a fast, accurate means of measuring voltages in telephone, telegraph, telemetering and control circuits. They also make possible quick, dependable tracing of circuit faults. All four instruments have direct reading meters calibrated in dbm from − 20 to + 2 dbm on the meter and −60 to + 40 dbm on the range changing attenuator. All contain a built-in calibration oscillator and a VTVM for swift, simple calibration. **For details, request Bulletin 107.** *(For wave analysis and harmonic studies 15 to 500 kc, Sierra offers Model 121 Wave Analyzer. Request Bulletin 103).*

SPECIFICATIONS

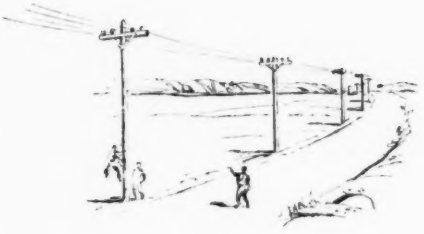
Model No.	Frequency Range—kc	Input Level Range—dbm	Selectivity		Direct Reading in dbm	
			Down 3 db	Down 45 db	Balanced	Unbalanced
101A	20—500	−80 to + 42	± 750 cps	± 6000 cps	*	600 ohms
103A†	3—40	−80 to + 42	± 400 cps	± 3000 cps	**	600 ohms
104	5—150	−80 to + 42	± 300 cps	± 1500 cps	**	600 ohms
108A	15—500	−80 to + 42	± 600 cps	± 3000 cps	135 ohms*	600 ohms

*May be converted for 135, 500 or 600 ohm balanced line measurements with Sierra 122 Line-Bridging Transformer. (Low cost, plug-in unit). **Same as 101A except uses Model 155 Transformer.
†Contains carrier re-insertion oscillator for monitoring single side band suppressed carrier systems.
Data subject to change without notice.

sierra

Sierra Electronic Corporation
San Carlos 2, California, U. S. A.
Sales representatives in major cities
Manufacturers of Carrier Frequency Voltmeters, Wave Analyzers, Line Fault Analyzers, Directional Couplers, Wideband RF Transformers, Custom Radio Transmitters, VHF-UHF Detectors, Variable Impedance Wattmeters, Reflection Coefficient Meters.
2068

ECONOMICAL



The low first cost and long life of Armstrong Glass Insulators mean real economy. You'll find they're built to last . . . to resist weathering, thermal shock, and other severe service conditions.

For information, write Armstrong Cork Company, Glass and Closure Division, 295 Fifth Ave., New York 16, New York.

Armstrong GLASS INSULATORS
for communications . . . for power

This announcement is neither an offer to sell nor a solicitation of an offer to buy any of these Shares. The offer is made only by the Prospectus.

189,844 Shares

Peninsular Telephone Company

Common Stock

(without par value)

The Company is offering to the holders of its outstanding Common Stock and to certain of its officers and employees the right to subscribe for these shares, as more fully set forth in the Prospectus. The subscription offers will expire at 3:30 P. M., Eastern Standard Time, on April 5, 1956.

Subscription Price $36 a Share

The several underwriters may offer shares of Common Stock at prices not less than the Subscription Price set forth above (less, in the case of sales to dealers, the concession allowed to dealers) and not more than either the last sale or current offering price on the New York Stock Exchange, whichever is greater, plus an amount equal to the applicable New York Stock Exchange Commission.

Copies of the Prospectus may be obtained from only such of the undersigned as may legally offer these Shares in compliance with the securities laws of the respective States.

MORGAN STANLEY & CO. ***COGGESHALL & HICKS***

G. H. WALKER & CO. ***MERRILL LYNCH, PIERCE, FENNER & BEANE***

A. M. KIDDER & CO. ***GOODBODY & CO.*** ***FRANCIS I. duPONT & CO.***

BACHE & CO. ***DREXEL & CO.***

March 22, 1956.

TRANSISTORS IN CIRCUITS

Concluded from page 22

of the transistor is poled oppositely to the manner which would cause much current to flow. It opposes the germanium and is, therefore, up against the high backward resistance of the material. But, because of this higher resistance, a much higher voltage can be used in the output.

The amount of current that flows in the crystal is determined by the current in the emitter. Therefore, the advantage of the higher current produced by the emitter is coupled with the higher voltage in the collector circuit, and an increase in power is the result.

Just as the vacuum tube may be connected in various ways, such as grounded grid, grounded cathode, and cathode follower, the transistor may be connected in ways that are different than the method shown here.

Other connections for transistors were shown in the article, "The Transistor—Its Future in the Telephone Field" by B. C. Burden (TELEPHONY, Jan. 9, 1954).

A number of pamphlets and books are available through the radio stores which would be of interest to those who might wish to experiment with transistors. The following two are helpful:

"28 Uses for Junction Transistors" (Sylvania Electric Products, Inc.—25 cents).

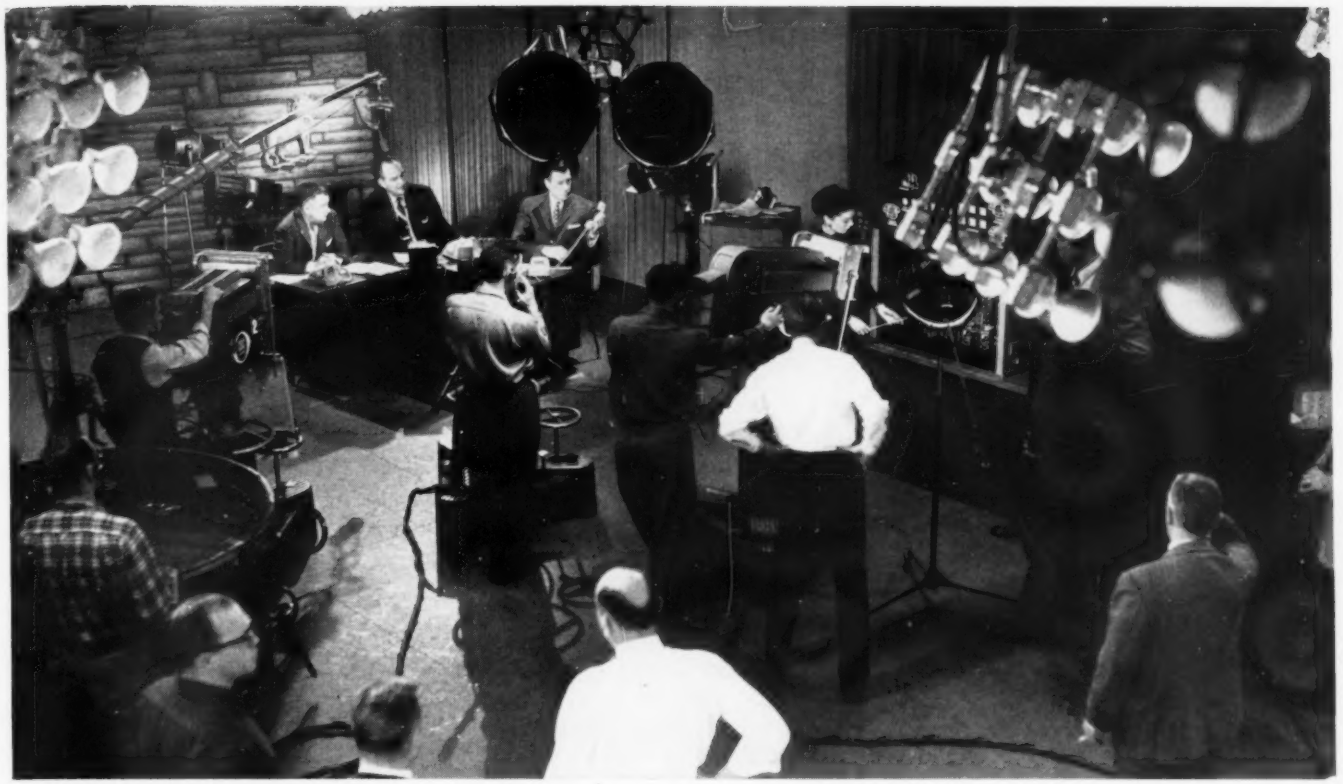
"Transistor Applications" (Raytheon Mfg. Co.—50 cents).

The next article will describe some of the applications of the transistor to the telephone field.

NW Bell Elects J. B. Moore Company Vice President

The board of directors of the Northwestern Bell Telephone Co. on Mar. 21 elected James B. Moore a vice president of the company. He will continue to serve as general manager in Nebraska.

Mr. Moore, a graduate of the University of Iowa, started with the company in 1926. He held various supervisory positions in the commercial department in Iowa, including district manager at Council Bluffs, prior to serving as district manager in Omaha from 1938 to 1944. He was commercial operations supervisor and later assistant vice president-operations. He became the first general plant manager for the company in South Dakota in 1949 and was named general manager in Nebraska last October.



Picture shows the telephone equipment industry program going "on the air" at CBS studios in Chicago. Seated at desk, left to right, are Fahey Flynn, program commentator; Leslie H. Warner, president, Automatic Electric Co.; T. H. Coulter, chief executive officer, Chicago Association of Commerce and Industry. Mr. Coulter dials a call while a girl model at right follows the action of the line finder, selector, and connector switches with a pointer, using a special switch demonstration unit. People in foreground are cameramen, sound technicians, property men, producers and director.

Telephone Equipment Industry on TV

A display of old and new telephones, depicting the evolution of the dial, shown on the TV show.

THE TELEPHONE equipment industry was featured on television recently in a program beamed to the Chicago area and sponsored by the Chicago Association of Commerce and Industry. It was produced by CBS-Television at its Chicago WBBM-TV studios.

Leslie H. Warner, president of Automatic Electric Co. was selected to serve as the industry spokesman. Thomas H. Coulter, chief executive officer of the Chicago Association of Commerce and Industry, emphasized at the opening of the program that in the 64 years since the first dial telephone was installed at La Porte, Ind., Chicago has become the center of the telephone equipment manufacturing industry, including in addition to Mr. Warner's company, Western Electric Co., Kellogg Switchboard & Supply Co., Leich Electric Co., and a number of other telephone equipment suppliers. The four largest companies in the Chicago area, according to Mr. Coulter, now produce about 450 million dollars worth of equipment for the telephone industry annually, and employ some 44,000 people.

During the interview that followed, Mr. Warner announced that there are some 4,900 Independent telephone companies in this country, serving approximately two-thirds of the geographic area and providing service to some 15 per cent of the more than 56 million telephones now in use.

The program moderator, Fahey Flynn, commented that the television audience would no doubt find this an astounding figure, and Mr. Warner agreed, remarking that most people think of the Bell System as being the telephone company.

In addition, Mr. Warner brought out that the Independent industry had contributed many of the technological advances to telephone art and science,

XUM

ENDURPRENE

• DROP • BRIDLE

PREMIUM GRADE INSULATION—TOUGH, ENDURING NEOPRENE JACKET

A COMBINATION HARD TO BEAT FOR LONG-RUN ECONOMY AND RELIABILITY

KELLOGG

DISTRIBUTED BY

KELLOGG — Division of I T & T

KELLOGG SWITCHBOARD AND SUPPLY COMPANY

A Division of International Telephone and Telegraph Corporation

MANUFACTURED BY

GENERAL INSULATED WIRE WORKS, INC. PROVIDENCE, R. I.

including invention and development of the dial system.

The program made wide use of film, exhibits and display units. The model of Almon Brown Strowger's first switch was shown, and then the cameras focused on a demonstration unit of a modern central office dial switching system to illustrate how a telephone call is made, from the moment a user picks up his handset until he either reaches his party or gets a busy signal.

This display was used also to highlight the fact that the telephone equipment the public is most familiar with —the telephone instrument itself—represents only a small portion of the total investment required to give telephone service, perhaps $30 to $35 out of a possible total investment of $450 per station.

The evolution of the dial was depicted with a display of the first automatic telephone of 1892 (which was operated by push buttons), the world's first dial telephone of 1896, (using the finger wheel device), the desk or table model dial of 1905, (when the dial telephone came down from the wall), the first popular handsets beginning in 1925, (when the Independents began making telephones available in color) and finally the new, modern designs.

Film supplied by the Lincoln (Neb.) Telephone & Telegraph Co. was used to show the startling evolution in operator's headsets. These first headset instruments, which consisted of a heavy, box-like device has now been replaced by light, easily worn, boom-type instruments weighing only a few ounces, Mr. Warner said.

The convenience of the dial in eliminating language barriers was highlighted on the program when the narrator showed a copy of a San Francisco Chinatown telephone directory formerly used by the Pacific Telephone & Telegraph Co. Before the Chinatown exchange was converted to dial, a switchboard operator not only had to know English, but at least five Chinese dialects. Travelers in foreign countries, of course, find the dial a great convenience.

In this connection, Mr. Warner recalled one experience when the dial almost failed to cope with a language barrier. "When we first started installing dial switching systems in the German populated areas of Wisconsin," he said, "we discovered to our consternation that some of the German-speaking people were having difficulty in getting the right number. So, we sent some men to investigate and soon found what the trouble was. The German people thinking of the number 21, as

SEAL OUT TROUBLE...

Permanently

with Easy-to-Use

KEARNEY Airseal

Corrosion and oxidation are no longer maintenance problems when your ground rod connections are sealed with KEARNEY Airseal. This weather-proof compound forms an air-tight coating over any shape connection with a simple squeeze of the hand. Airseal will not deteriorate . . . even when used on ground rod connections below ground. It remains pliable indefinitely . . . at temperatures from –50°F up to 250°F.

For time-saving use KEARNEY Airseal — available in convenient sized pads, or in 10-foot rolls.

For Better Construction . . . For Safer Maintenance

Specify 263

KEARNEY PRODUCTS

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Canadian Plant: Guelph, Ontario

"ein und zwanzig" or "ein zwanzig" as some speak it (that is, 1 and 20) were dialing 1 and 20 instead of 2 and 1, and naturally they were getting the wrong number."

In response to a question about automation, Mr. Warner remarked that if it were not for the dial he did not believe it would be possible to hire enough operators in this country to handle all the telephone calls on a manual basis. The telephone industry today already employs over one million people, almost 1/60th of the total gainfully employed population, he noted.

Mr. Warner closed his part of the program by looking ahead. "We have the greatest faith in the future of the communication industry," he said, and then called attention to the industry's second great stage of mechanization, the first being the converting of exchanges to local dial service. "Now we are making progress toward mechanizing the whole country (with Direct Distance Dialing) so that you and other people will be able to dial any place in the United States and Canada without going through an operator."

Ind. Company Reincorporates Under New Name

The reincorporation of the Uniondale (Ind.) Rural Telephone Co. was authorized by stockholders recently.

The company, which serves Ossian, Zanesville and Uniondale, will be incorporated under the name of Uniondale Telephone Co., Inc.

The directors and incorporators are Luther Dettmer, president; Roe Hunter, Frank Vanzant and John R. Cupp, directors.

N. C. Independents Plan Mobile Disaster Unit

The North Carolina Independent Telephone Association has announced plans to establish a special mobile unit which can be put into action in any part of North Carolina struck by disaster.

The announcement was made on Mar. 21 following a meeting at Lexington of the association's disaster committee.

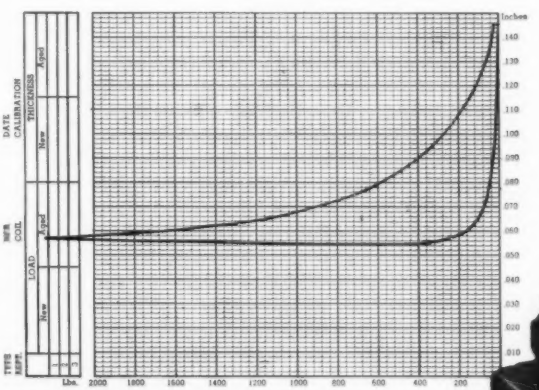
Linn D. Garibaldi of Matthews and Charlotte, chairman of the committee, said "The unit should assist greatly when disasters such as last year's hurricanes strike. Our association aided areas hit by hurricanes then, and now, with the equipment we plan to install, we should be able to offer even greater assistance."

Mr. Garibaldi said the new unit is "one vitally needed," and plans are to equip it with a large carrier with instruments and other necessary materials so the unit may be sent to a

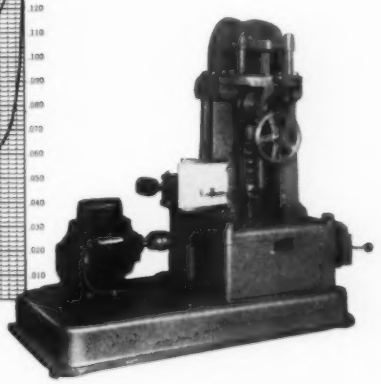
No. 1 in a series of test results on LOWELL TELEPHONE WIRES: Resistance to Compression

LOWELL TELEPHONE WIRES ARE COMPRESSION TESTED TO INSURE LONG LIFE IN SERVICE

In determining the ability of a drop wire to stand up in service, resistance to compression is a major factor. All Lowell parallel neoprene jacketed drop wire is tested in our laboratory to withstand pressure of 2000 lbs. or more before the insulation jackets are crushed. To insure this high resistance to compression, all conductors are brass flashed and special insulating and jacketing compounds are used. Since resistance to compression determines the quality of the adhesion these tests prove that Lowell Drop Wire will stand the crushing action of the P Clamp without cracking of the insulation or jacket, thus insuring dependability and long life in service.



Typical test for Lowell LND18PD2 No. 18 AWG Dumbell design parallel wire, illustrated showing minimum resistance to compression of 2000 lbs.



COMPRESSION TESTER — tests and records resistance to compression of plastic or rubber insulation jackets.

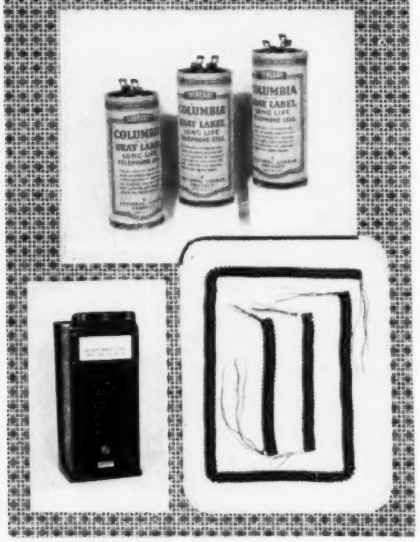
Write today for Lowell Insulated Wire Catalog or mention your wiring needs.

"Fine Wires Only"

LOWELL INSULATED WIRE COMPANY

171 LINCOLN STREET ··· LOWELL, MASSACHUSETTS

You Can Always Rely on the Quality of Suttle Supplies



Gray Label Batteries

—— one of the oldest standbys in the telephone business —always the standard of highest quality—have been sold by Suttle as far back as we can remember.

Koiled Kords

—— one of the newest products in the telephone business that have proved their merit— a really worthwhile advance — are stocked in all sizes, up to and including the 25-foot extension cord.

Autelco Pay Stations

—— the continuation of the Gray pay station line — a revenue-producing necessity from away back — no substitutes — you'll find all popular standard models in stock at Suttle.

See Your SUTTLE Catalog

Serving Independent Telephone Men Since 1910

Suttle EQUIPMENT CO.

LAWRENCEVILLE ILLINOIS

disaster area with the necessary manpower. "It will only take power hookups to put the unit into operation," he said.

Plans are to offer the unit for public display in all North Carolina cities when it is completed. Headquarters of the unit will be at Matthews, which is centrally located in the state.

In addition to Garibaldi, members of the association's disaster committee are: W. C. Harris of Lexington, Frank LaPrade of Martinsville, Va.; W. S. Beddingfield of Mount Airy, John E. Cline of Southern Pines, J. K. Avent of Tarboro, Thomas H. Sawyer of Weaverville, R. E. Kepler of Durham and Harry Dewey of Elizabeth City.

E. N. White Named Head Of New England T&T

Erskine N. White of Winchester, Mass., was elected president of the New England Telephone & Telegraph Co., at a meeting of the company's board of directors held in New York on Mar. 20. Vice president of the company since 1945, Mr. White succeeds Joe E. Harrell, who becomes chairman of the board. Mr. Harrell will retire later this year after 43 years of service in the Bell System.

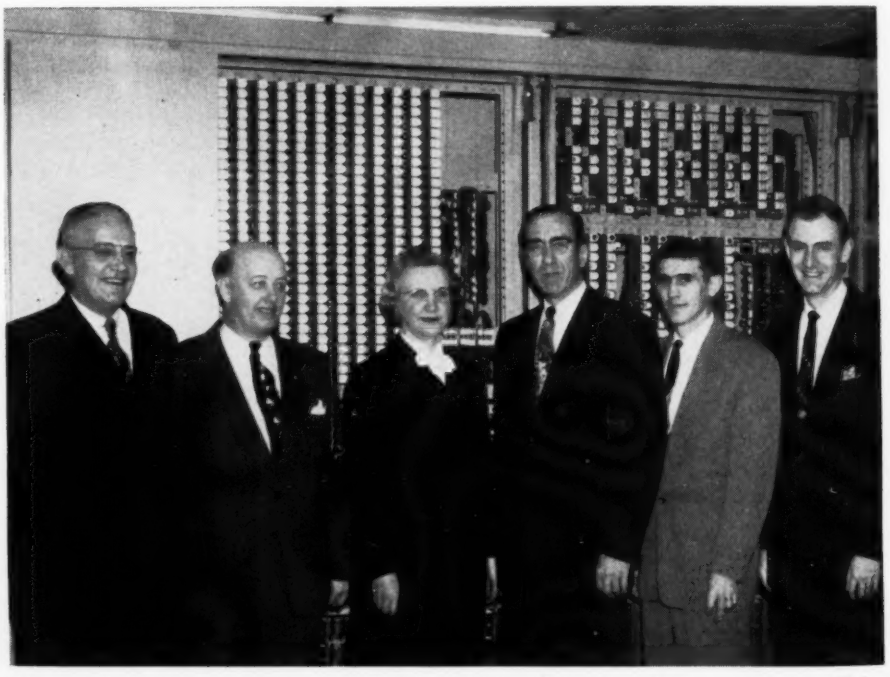
Mr. White has been vice president of the New England Telephone & Telegraph Co. since 1945, and a director since 1946. His service in the Bell System began with the American Telephone & Telegraph Co. in 1923, and he joined the New England company in 1929. He held successive positions in the traffic and commercial departments until 1941, when he went to Washington as assistant director in the Office of Production Management.

Prior to his assignment as vice president in charge of operations in 1950, Mr. White served as director of public relations, vice president public relations and personnel, vice president and general manager, and vice president rate and revenue requirements.

At the annual stockholders' meeting Frederick A. Cosgrove of Wellesley, Mass., and Thomas M. Hennessey of Winchester, Mass., were elected directors to fill vacancies on the board. Mr. Cosgrove has been a vice president of the company since 1950, and Mr. Hennessey a vice president since 1946.

Elected vice president was Albert C. Palmer, formerly of the New England Telephone & Telegraph Co., and since 1954, assistant vice president of the American Telephone & Telegraph Co. in New York.

Following the election of officers by the board of directors, President White



Dial service was inaugurated at Chaska, Minn., recently when the Pioneer Telephone Co., Waconia, cut over its new Chaska exchange under the direction of Harold Bollinger (fourth from left), general manager, and K. Larson, equipment and building engineer (far right). The new switchboard, a North CXJ 1,000, is the jack-in type, initially equipped for 450 lines, terminal per station. The occasion was celebrated with a pre-cut-over dinner attended by commission, civic and company officials. The guests witnessed the cut-over ceremony and inspected the new plant. Shown above during the inspection trip are (left to right): Dewey Danner, chief installer; Martin Stanley, region manager, of North Electric; Mrs. Harold Bollinger, Mr. Bollinger, G. W. Tallman, installer, and Mr. Larson.

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designated Mr. Cosgrove as vice president in charge of operations and Mr. Palmer as vice president in charge of personnel.

D. I. Thurlby New Leich Purchasing Agent

L. M. Wells, president of Leich Electric Co., announces the appointment of Donald I. Thurlby to the position of purchasing agent for the company.

D. I. THURLBY

He succeeds W. C. Rosenfeld who passed away recently and who had been Leich's purchasing agent for many years.

Mr. Thurlby has been assistant purchasing agent since June 1952. His experience with Leich dates back to 1946 when he was employed in the production control department.

He was educated at the Northern Illinois State College of DeKalb.

Fire Losses in U. S. Down For February 1956

Estimated fire losses in the United States during February amounted to $84,041,000, the National Board of Fire Underwriters has reported.

According to Lewis A. Vincent, the Board's general manager, this $84,041,000 loss represents a decrease of 1.2 per cent from losses of $85,046,000 reported for February 1955, and a decrease of 13.3 per cent from losses of $96,972,000 for January 1956.

These estimated losses include an allowance for uninsured and unreported losses.

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Index to ADVERTISERS

	Page
Acme Visible Records, Inc.	12
Alphaduct Wire & Cable Co., The	—
Aluminum Company of America	—
American Appraisal Company, The	—
American Chain & Cable Co., The Page Steel & Wire Div.	—
American Creosoting Company	—
American Electrical Heater Co.	—
American Steel & Wire Co.	—
American Telephone & Telegraph Co.	—
Anaconda Wire & Cable Co.	—
Ansonia Wire & Cable Co., The	35
Armstrong Cork Co., Glass Insulator	54
Atlantic Creosoting Co., The	61
Automatic Electric Sales Co.	31, 32-33, 39
Bakelite Company	—
Baker Wood Preserving Co.	—
Bartlett Tree Experts	—
Bashlin Company, W. M.	—
Bell Telephone Laboratories, Inc.	—
Benner-Nawmann, Inc.	—
Berry & Co., L. M.	—
Bethlehem Steel Co.	—
Bishop Mfg. Corp.	—
Blaw-Knox Company	27
Brach Mfg. Corp.	—
British Insulated Callendars Cables, Ltd.	—
Buckeye Telephone & Supply Co.	60
Burgess Manning Company	—
Burroughs Corp.	—
C&D Batteries, Inc.	—
Cabaniss-Pogue Company	59
Cable Spinning Equipment Co.	—
Calculagraph Company	47
Chance Co., A. B.	—
Chase Brass & Copper Co.	—
Cleverly Electrical Works, The	—
Coffing Hoist Div.	—
Collins Radio Co.	—
Commercial Cord & Supply Co., Inc.	—
Cook Electric Company	4-5
Copperweld Steel Co.	9
Crane, Inc., Carl C.	59
Cullom & Ghertner	—
Davis Construction Co.	—
Diamond Expansion Bolt Co.	—
Donnelly & Sons, R. R.	—
Dow Chemical Co., The	—
Du Pont de Nemours & Co., E. I.	—
Duo-Safety Ladder Corp.	—
Eastman Chemical Products, Inc.	—
Electric Specialty Co.	—
Everstick Anchor Co.	—
Exide Industrial Division—The Electric Storage Battery Co.	—
Fitchburg Engineering Corp.	—
Foley Constr. Corp., Robert E.	63
Four Wheel Drive Auto Co., The	—
General Cable Corporation	—
General Insulated Wire Works, Inc.	56
General Machine Products Co., Inc.	—
General Telephone Directory Co.	64
Gorman-Rupp Company	—
Gould-National Batteries, Inc.	16
Graybar Electric Co.	—
Greenlee Tool Co.	—
Haley & Co., R. G.	—
Harris-McBurney Company	59
Henkels & McCoy	59
Heywood, T. A.	59
Highway Trailer Company	—
Hirsch Organization, Inc., Gustav	41
Holan Corporation, J. H.	—
Homelite Corporation	—
Hubbard & Co.	29
Indiana Steel & Wire Co.	—
International Business Machines Corp.	—
International Harvester Co.	—
International Standard Electric Corp.	—
International Standard Trading Corp.	—
Irwin-Auger Bit Co., The	—
Johns-Manville	—
Kander and Company, Allen	—
Katolight Corp.	—
Kearney Co., Jas. R.	56
Kellogg Switchboard & Supply Co.	6-7, 36-37
Klein & Sons, Mathias	48
Koiled Kords, Inc.	50
Koppers Co., Inc.	46
Leich Sales Organization	10-11
Lindsay Telephone Supply Co.	51
Line Material Co.	—
Linen Thread Co., Inc.	—
Lorain Products Corp., The	—
Lowell Insulated Wire Company	57
Markwell Mfg. Co., Inc.	62
McCabe-Powers Auto Body Co.	—
McFarland Company, L. D.	61
Monsanto Chemical Co.	—
Morton Contracting Co.	59
Murphy Engineering Laboratory	52
Natco Corporation	—
National Carbon Div.	—
National Pole & Treating Div.	—
National Telephone Supply Co.	—
Neale Construction Co.	59
North Electric Company	14-15
Onan & Sons, D. W.	52
Ostlund, Everet M.	—
Owens-Illinois	—
P & A Manufacturing Co.	62
Page & Hill, Inc.	—
Plastic Wire & Cable Co.	13
Plymouth Motor Div.	—
Porcelain Products, Inc.	—
Porter, H. K., Inc.	—
Preformed Line Products Co.	45
Radio Engineering Products Limited	—
Raytheon Mfg. Co.	—
Rebuilt Electric Equipment	60
Recordak Corp.	—
Reliable Electric Co.	63
Republic Creosoting Co.	—
Remington Rand Inc.	49
Roebling's Sons Co., John A.	—
Reynolds Metals Company	—
Rolatape, Inc.	—
Runzel Cord & Wire Corp.	—
S&G Manufacturing Corp.	—
Schauer Mfg. Co.	44
Seymour-Smith & Sons, Inc.	—
Sierra Electronic Corporation	53
Signal Engineering & Mfg. Co.	46
Sloan, Cook & Lowe Co.	59
Soapstone Duct Co.	—
Stahl Metal Products, Inc.	—
Stanley, Morgan & Co.	54
Stewart Bros.	—
Stromberg-Carlson Co.	2-3, 42-43, 59
Superior Cable Corporation	—
Suttle Equipment Co.	58, 61
Taylor-Colquitt Co., The	—
Telectric Co., The	61
Tel-E-Lect Products Inc.	—
Telephone Answering & Recording Corp.	—
Telephone & Power Supply Co.	61
Telephone Supply Corp.	—
Teletype Corporation	—
Tele-Wire Supply Co., Inc.	—
Telkor, Inc.	—
Templeton Kenly & Co.	—
Transandean Associates, Inc.	—
Tudor & Yager, Inc.	59
United States Independent Telephone Assoc.	—
United States Steel Corp. American Steel & Wire Co.	—
Coal Chemical Div.	—
Universal Controls Corp.	—
Utica Drop Forge & Tool Corp.	—
Utility Equipment Co.	—
Warn Mfg. Co.	—
Weikel Line Co., The	59
Western Electric Co.	—
Weston Electrical Instrument Corp.	—
Whitney Blake Co.	—
Williams Inspection Co., A. W.	59
Willys Motors, Inc.	—
Wiremold Co., The	44
Wyoming Valley Equipment Div.	—
Yankee Tools, a Division of Stanley Tools	50
York-Hoover Corporation	—

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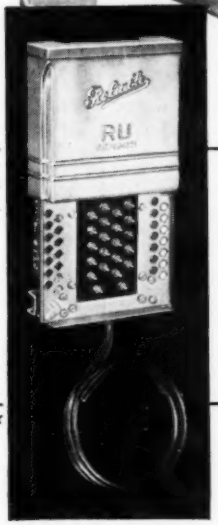

Capacity	Height Overall	Stub Data	Shipping Wt. Each Pounds
6 Pair	11"	Less Stub	4
		With 6' Stub	7
11 Pair	11"	Less Stub	4½
		With 6' Stub	7½
16 Pair	12½"	Less Stub	5
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